Figure 1 – Cross Section of an Single Pass Sand Filter with Gravity Discharge.

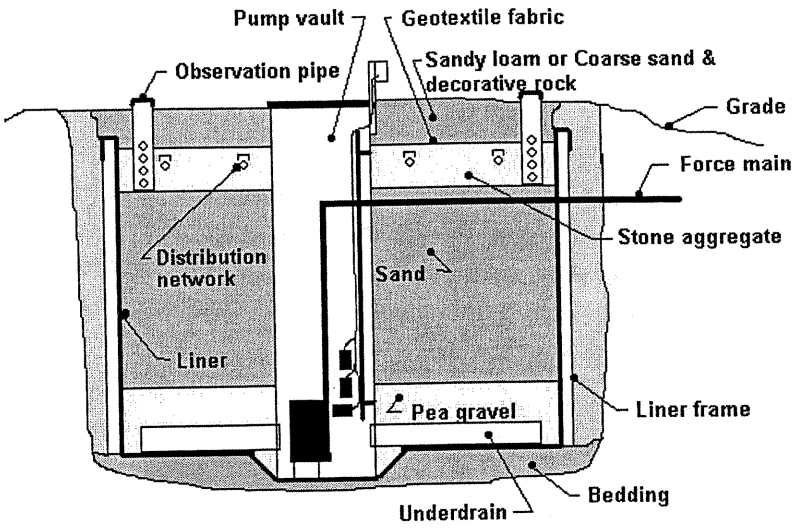

Figure 2 – Cross Section of an Single Pass Sand Filter with Pumped Discharge.

IV DESIGN

A. Size- Sizing of the single pass sand filter must be in accordance with this manual. The means of pressurizing the distribution network must provide equal distribution of influent over the distribution cell. A pressurized distribution network sized using the charts and graphs contained in this manual and methods delineated in either Small Scale Waste Management Project publication 9.6, entitled "Design of Pressure Distribution Networks for Septic Tank – Soil Absorption System" or Dept. of Commerce publication SBD-10573-P, entitled "Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems" is acceptable.

B. Single Pass Sand Filter Component Design – Detailed plans and specifications must be developed, reviewed and approved by the governing unit having authority over the plan for the installation. A Sanitary Permit must also be obtained from the department or governmental unit having jurisdiction.

Design of the single pass sand filter component is based on the design wastewater load. It must be sized such that it can accept the daily wastewater load at a rate that will provide treatment.

Design of the single pass sand filter includes four steps, which are: (A) calculating the design wastewater load, (B) design of single pass sand filter component, (C) calculating the dose volume, number of doses per day, surge capacity of the tank or chamber that houses the pump dosing the component, and (D) design of distribution network. Steps A, B and C are discussed in this manual. Step D is not discussed in this manual. A design example is included in section IX of this manual.

Step A. Design Wastewater Flow

One- and two-family dwellings. The distribution cell size for one and two-family dwelling application is determined by calculating the design wastewater flow (DWF). To calculate DWF use formula 1.

Formula 1

DWF = 150 gallons/day/bedroom

Public. Distribution cell size for public facility application is determined by calculating the DWF using formula 2. Public facility estimated daily wastewater flows are listed in Table 4. Facilities that are not listed in Table 4 are not included in this manual. Many commercial facilities have high BOD_5, TSS and FOG (fats, oil and grease), which must be pretreated in order to bring their values down to an acceptable range before entering into the single pass sand filter component described in this manual.

Formula 2

DWF = Sum of each wastewater flow per source per day (from Table 4) x 1.5

Table 4

Public Facility Wastewater Flows

Source	Unit	Estimated Wastewater Flow (gpd)
Apartment or Condominium	Bedroom	100
Assembly hall (no kitchen)	Person (10 sq. ft./person)	1.3
Bar or cocktail lounge (no meals served)	Patron (10 sq. ft./patron)	4
Bar or cocktail lounge* (w/meals - all paper service)	Patron (10 sq. ft./patron)	8
Beauty salon	Station	90
Bowling alley	Bowling lane	80
Bowling alley (with bar)	Bowling lane	150
Camp, day and night	Person	25
Camp, day use only (no meals served)	Person	10
Campground or Camping Resort	Space, with sewer connection and/or service building	30
Campground sanitary dump station	Camping unit or RV served	25
Catch basin	Basin	65
Church (no kitchen)	Person	2
Church* (with kitchen)	Person	5
Dance hall	Person (10 sq. ft./person)	2
Day care facility (no meals prepared)	Child	12
Day care facility* (with meal preparation)	Child	16
Dining hall* (kitchen waste only without dishwasher and/or food waste grinder)	Meal served	2
Dining hall* (toilet and kitchen waste without dishwasher and/or food waste grinder)	Meal served	5
Dining hall* (toilet and kitchen waste with dishwasher and/or food waste grinder)	Meal served	7
Drive-in restaurant* (all paper service with inside seating)	Patron seating space	10
Drive-in restaurant* (all paper service without inside seating)	Vehicle space	10
Drive-in theater	Vehicle space	3
Employees (total all shifts)	Employee	13
Floor drain (not discharging to catch basin)	Drain	25
Gas station / convenience store	Patron (minimum 500 patrons)	3
Gas station (with service bay) Patron Service bay	 Patron Service bay	 3 50
Hospital*	Bed space	135
Hotel, motel or tourist rooming house	Room	65
Medical office building Doctors, nurses, medical staff Office personnel Patients	 Person Person Person	 50 13 6.5
Migrant labor camp (central bathhouse)	Employee	20
Mobile Home (Manufactured home) (served by its own POWTS)	Bedroom	100
Mobile home park	Mobile home site	200

* = May be high strength waste

Table 4

Public Facility Wastewater Flows

(continued)

Source	Unit	Estimated Wastewater Flow (gpd)
Nursing, Rest Home, Community Based Residential Facility	Bed space	65
Outdoor sport facilities (toilet waste only)	Patron	3.5
Parks (toilets waste only)	Patron (75 patrons/acre)	3.5
Parks (toilets and showers)	Patron (75 patrons/acre)	6.5
Public shower facility	Shower taken	10
Restaurant*, 24-hr. (dishwasher and/or food waste grinder only)	Patron seating space	4
Restaurant*, 24-hr. (kitchen waste only without dishwasher and/or food waste grinder)	Patron seating space	12
Restaurant, 24-hr. (toilet waste)	Patron seating space	28
Restaurant*, 24-hr. (toilet and kitchen waste without dishwasher and/or food waste grinder)	Patron seating space	40
Restaurant*, 24-hr. (toilet and kitchen waste with dishwasher and/or food waste grinder)	Patron seating space	44
Restaurant* (dishwasher and/or food waste grinder only)	Patron seating space	2
Restaurant* (kitchen waste only without dishwasher and/or food waste grinder)	Patron seating space	6
Restaurant (toilet waste)	Patron seating space	14
Restaurant* (toilet and kitchen waste without dishwasher and/or food waste grinder)	Patron seating space	20
Restaurant* (toilet and kitchen waste with dishwasher and/or food waste grinder)	Patron seating space	22
Retail store	Patron (70% of total retail area ÷ 30 sq. ft. per patron)	1
School* (with meals and showers)	Classroom (25 students/classroom)	500
School* (with meals or showers)	Classroom (25 students/classroom)	400
School (without meals or showers)	Classroom (25 students/classroom)	300
Self-service laundry (toilet waste only)	Clothes washer	33
Self-service laundry (with only residential clothes washers)	Clothes washer	200
Swimming pool bathhouse	Patron	6.5

* = May be high strength waste

Step B. Design of the Single Pass Sand Filter Component - This section determines the required size of the distribution cell area as well as the dimensions for the complete single pass sand filter component.

1. Determine the distribution cell area.

   The distribution cell area is calculated by dividing the design wastewater flow by a design loading rate of ≤ 1.25 gal/ft^2

   Distribution cell area = DWF ÷ DLR

2. Determine the width and length of the distribution cell.

   The width and length are determined by dividing the distribution cell area by a chosen dimension for either the width or length.

   Length of distribution cell = distribution cell area ÷ chosen cell width

   or

   Width of distribution cell = distribution cell area ÷ chosen cell length

3. Location of observation pipes.

   The sand filter must include two observation pipes. The observation pipes are located at a distance equal to approximately 1/6 the distribution cell length from each end along the center of the filter's width.

Step C. Dose volume, number of doses, and surge capacity - Calculation of the dose volume, number of doses per day, and surge capacity of the tank or chamber that houses the pump dosing the component. These volumes and frequency of dosing are important so that the filter can provide its intended treatment.

1. Volume of a single dose.

   The volume of a single dose is determined by multiplying the distribution cell area by a volume of a single dose that is ≤ 0.08 gal/ft^2/dose.

   Volume of single dose = distribution cell area x ≤ 0.08 gal/ft^2/dose

2. Number of doses per day.

   The number of doses per day is determined by dividing DWF by the volume of a single dose.

   Number of doses per day = DWF ÷ gal/dose

3. Surge capacity of the tank or chamber that houses the pump dosing the component.

The surge capacity of the tank or chamber that contains the pump which doses the filter consists of two zones of the tank or chamber. Surge zone 1 is between the "pump on" elevation and "alarm on" level. This zone must be a volume that equals at least 2/3 of the DWF. Surge zone 2 is between the "alarm on" level and the inlet of the tank or chamber. This zone must be a volume, which equals at least 1/3 of the DWF.

Surge zone 1 = DWF ÷ 3 x 2

Surge zone 2 = DWF ÷ 3

Step D. Distribution Network and Dosing System A pressurized distribution network sized using the tables and graph contained in this manual and methods delineated in either Small Scale Waste Management Project publication 9.6, entitled "Design o f Pressure Distribution Networks for Septic Tank – Soil Absorption Systems" or Dept. of Commerce publication SBD-10573-P, entitled "Pressure Distribution Component Manual for Private Onsite Wastewater Treatment Systems" is acceptable.

C. Other specification for materials and design

1. Container and excavation

A watertight container, such as a durable 30 mil. PVC or 45 mil. EPDM liner is required. The liner must be protected from punctures that can be caused by sharp rocks and construction tools. The filter can be placed at various elevations in the landscape from placement on the ground surface with soil mounded over it to buried with the top 2" to 6" below ground surface. It is imperative that surface and ground water not be allowed to enter the filter.

The excavation is made 6" to 12" larger than the filter. Untreated plywood, waferboard or other suitable material is formed into a box to support the liner and allow the liner to be draped over the top. Only sand is placed between the frame and soil to protect the liner after the plywood has decomposed. Approximately 2" of sand is placed in the bottom of the excavation prior to placement of the liner. The top of the liner must be above the seasonal high water table so ground water does not flow into the sand filter.

When the excavation around the frame is backfilled, it is done with sand that is placed in one foot increments and compacted by use of water or tamping prior to additional sand being placed.

2. Effluent collection

A 4" underdrain pipe with slots or holes is placed on the liner to collect the sand filter effluent. The collection pipe connects to an internal pump vault or extends outside the tank to an external pump chamber or drains by gravity to a dispersal area. A boot is glued to the liner and attached to the pipe to eliminate the intrusion of groundwater through the opening or to prevent ponded effluent from exiting. For an internal pump vault, an excavation is made in the center of the filter and lined with sand prior to placement of the liner. The size and shape of the excavation must be adequate for the pump, pump controls and other necessary equipment.

3. Aggregate

A layer of stone aggregate is placed around and mounded over the collection pipe. A six to eight inch layer of washed pea gravel is placed on the liner with a two inch layer of washed pea gravel placed on top of the aggregate to keep the sand from infiltrating into the larger aggregate.

4. Sand media

A two-foot layer of sand, placed in 8" lifts and wetted to minimize settling, is placed on top of the pea gravel. The top of the sand is leveled. Media size, septic tank effluent quality and loading rates are interrelated. Table 3 gives the requirements for the sand media.

5. Distribution network

The distribution network spreads the septic tank effluent as uniformly as possible over the sand filter surface. The network consists of a manifold and laterals. Typical design consists of:

a. Orifices - orifices are located upward with orifice shields.

b. Laterals – laterals are spaced 2' apart. Each lateral terminates with an upturned long sweep elbow and valve that can be used for cleaning. Lateral lengths can not exceed those given in Table 5 for various diameters. Laterals are sloped back in order to provide drainage of lateral between doses.

c. Manifold – manifolds slope back to the force main to provide drainage for the manifold between doses. The manifold is sized using Table 6.

d. Force main – Force main slopes back to provide drainage of the force main between doses. The force main is sized using Table 7.

e. Valve Boxes - Valve boxes are required to provide access to the valves on the laterals. The covers must provide a water tight cap.

f. Pump - Sized to meet flow rate and lateral pressure of a minimum of 5' at distal end.

Two inches of stone aggregate is placed on the leveled sand surface. The distribution network is placed in the stone aggregate with laterals and manifold sloping back to force main. Additional aggregate is placed on top of the network with a minimum cover of one inch. The force main is placed through the plywood wall and liner. A boot is glued

to the liner and attached to the pipe to eliminate the intrusion of groundwater through the opening or to prevent ponded effluent from exiting.

Table 5 Maximum length of distribution laterals for Schedule 40 PVC pipe having 1/8 inch orifices spaced 2 ft apart with 5 ft of head at distal end				
Lateral Diameter in inches	Maximum length in feet	Number of Orifices	Total Flow in gpm	Input Head in feet
¾	16	13	5.9	6.2
1	44	22	9.7	6.1
1-1/4	66	33	14.4	6.1
1-1/2	90	45	19.5	6.0
2	146	73	31.2	6.0

Table 6
Maximum Manifold Length Based on Individual Lateral Flow Rates and 2 Foot Lateral Spacing

Individual Lateral Discharge Rate		1-1/4" Diameter Manifold	1-1/2" Diameter Manifold	2" Diameter Manifold	3" Diameter Manifold
End Manifold	Center Manifold				
10	5	6 ft	8 ft	12 ft	18 ft
20	10	4 ft	6 ft	8 ft	14 ft
30	15	2 ft	4 ft	6 ft	12 ft
40	20	2 ft	2 ft	6 ft	10 ft
50	25	NP[a]	2 ft	4 ft	8 ft
60	30	NP	2 ft	4 ft	8 ft
70	35	NP	NP	2 ft	6 ft
80	40	NP	NP	2 ft	6 ft
90	45	NP	NP	2 ft	6 ft
100	50	NP	NP	2 ft	4 ft

Note a: NP means Not Permitted

Table 7
Friction Loss (foot/100 feet) in Plastic Pipe[a]

Flow in	Nominal Pipe Size				
GPM	1-1/4"	1-1/2"	2"	3"	4"
10	2.50				
11	2.99				
12	3.51				
13	4.07				
14	4.66	1.92	Velocities in this area are below 2 feet per second		
15	5.30	2.18			
16	5.97	2.46			
17	6.68	2.75			
18	7.42	3.06			
19	8.21	3.38			
20	9.02	3.72			
25	13.63	5.62	1.39		
30	19.10	7.87	1.94		
35	25.41	10.46	2.58		
40	32.53	13.40	3.30		
45	40.45	16.66	4.11		
50	49.15	20.24	4.99		
60	Velocities in this area exceed 10 ft per second, which are not acceptable velocity for this pipe diameter	28.36	7.00	0.97	
70		37.72	9.31	1.29	
80			11.91	1.66	
90			14.81	2.06	
100			18.00	2.50	0.62

Note a: Table is based on Hazen – Williams formula: $h = 0.002082L \times (100/C)^{1.85} \times (gpm^{1.85} \div d^{4.8655})$

Where: h = Feet of head L = Length in feet

C = Friction factor from Hazen – Williams (145 for plastic pipe)

gpm = gallons per minute d = Nominal pipe size

6. Observation pipes

At least two 4" observation pipes are placed to the sand/aggregate interface to monitor for ponding and/or formation of a clogging mat. The tubes must be secured and have perforations in the bottom 4 inches. See figure 3.

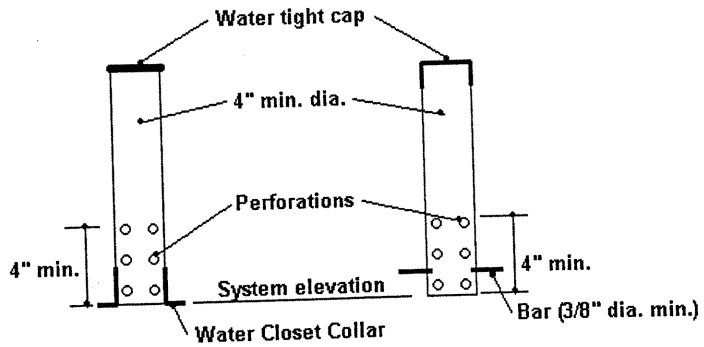

Figure 3 – Observation pipes

7. Sand filter pump vault and force main to distribution area.

The force main exiting the pump vault must be sloped to either drain back to the pump vault or to the distribution area. It may exit the sand filter above the liner, if not, a boot is installed similar to the boot installed for the force main from the septic tank pump chamber. Electrical wires from the control panel to the pump vault should be placed in conduit that is located on top of the aggregate. The pump can be a centrifugal effluent pump. It may also be a turbine pump, which will provide higher heads and lower flows. High and low level floats control the liquid level in the sand filter. The high water alarm, when activated, must shut off the septic tank effluent pump so as not to flood the sand filter. The two pumps must be interconnected so if the sand filter pump fails to pump, the septic tank pump will not pump effluent to the sand filter.

8. Fabric and cover

Geotextile fabric meeting the requirements of ch. Comm 84, Wis. Admin. Code, is placed on top of the aggregate, which covers the distribution network. The filter can be either covered with sandy loam and sodded or seeded and mulched or decorative rock can be placed on the geotextile fabric.

Lawn: Up to six inches of sandy loam or coarser soil is placed on the fabric, seeded and mulched. All surface waters must be diverted away from the single pass sand filter. The pump vault and valve box covers must be placed at ground surface for easy access but below the reach of a lawn mower.

Decorative rock: To eliminate the potential for "septic type" odor emitting from the filter when it is dosed, up to 2" of coarse sand is placed on the filter fabric. Decorative rock or other aggregate is placed on top of the sand to final grade. All surface waters must be diverted away from the sand filter.

9. Control panel

The sand filter is dosed by timed doses. The septic tank/pump chamber must provide for surge loading and surge (reserve) volumes.

10. Air tube

An optional air tube can be placed on top of the aggregate below the sand with a vertical pipe connected to one end and extended to the top of the filter. This allows air to be supplied via a pump to the filter if needed at a later date. The tube can be drip irrigation tubing placed in concentric circles on the aggregate surface or 3/4" diameter PVC pipe with 1/8" holes spaced 2 ft apart with 2 ft. lateral spacing, connected to a 1" PVC manifold. Air is pumped into the filter to provide additional oxygen to break up a clogging mat that may develop on the sand surface. It is used only when effluent becomes ponded at the aggregate/sand interface. Air is not pumped into the sand filter when air temperatures are below freezing as it may freeze the filter.

V. CONSTRUCTION

Procedures used in the construction of the single pass sand filter are just as critical as the design of the component. A good design with poor construction results in component failure.

A. Lay out the location and size of the single pass sand filter.

B. Determine where the pipe from the dosing pump will connect to the effluent distribution system of the single pass sand filter.

C. Excavate for the single pass sand filter to the correct elevation.

D. Place at least 2 inches of sand for bedding material in the bottom of the excavation to protect the liner.

E. Construct a form to hold the sides of the liner in place. Make sure there are no sharp edges or protrusions that may result in puncturing the liner material. The top or the liner terminates at a distance within 6 inches but greater than 2 inches below finish grade.

F. Install the liner.

G. Install the pump chamber if the single pass sand filter contains an internal pump chamber as part of its design. If the underdrain discharges by gravity from the single pass sand filter, install the boot that will seal the underdrain exit opening through the liner.

H. Install the under drain with the slots in the up position or holes in the up or side position making sure to seal the opening for the underdrain into the pump chamber or through the liner.

I. Cover the sides and top of the under drain with stone aggregate until the depth of the aggregate over the pipe is at least two inches.

J. Place six inches of pea gravel in the bottom of the single pass sand filter making sure there is at least two inches of pea gravel over the stone aggregate.

K. Backfill the excavation around the perimeter as you place the material inside of the single pass sand filter. The depth of backfill is kept near the same depth as the depth of fill inside of the liner.

L. Place and wet down 8 inches of sand media meeting the specifications listed in Table 3 over the pea gravel. Repeat this step until a depth of at least 24 inches is reached.

M. Install the required observation pipes with the bottom 4 inches of the observation pipe perforated. Installations of all observation pipes include a suitable means of anchoring. See figure 3.

N. Place 2 inches of stone aggregate over the sand media.

O. Install the valve boxes, cleanouts and pressure distribution network with laterals sloped at least 1 inch toward the manifold.

P. Test the system to adjust the head pressure to at least 5 feet at the distal orifice.

Q. Install the orifice shields.

R. Place at least 2 inches of stone aggregate over the distribution laterals.

S. Cover the stone aggregate with a geotextile fabric that meets the specifications of ch. 84 of the Wis. Adm. Code.

T. Cover the geotextile fabric with 6 inches of sandy loam or coarser material(s), such as decorative rock.

VI. OPERATION, MAINTENANCE and PERFORMANCE MONITORING

A. The component owner is responsible for the operation and maintenance of the system. The county, department or POWTS service contractor may make periodic inspections of the components, and effluent levels, etc.

The owner or owner's agent is required to submit appropriate records routinely to the county or other appropriate jurisdiction and/or the department.

B. Design approval and site inspections before, during, and after the construction are accomplished by the county or other appropriate jurisdictions in accordance to Ch. Comm 83 of the Wis. Adm. Code.

C. Other routine and preventative maintenance aspects are:

1. Treatment and dispersal tanks are to be inspected routinely and maintained when necessary in accordance with their approvals.

2. Inspections of single pass sand filter component performance is required at least every six months for the first two years. Then once a year for the next two years. Then once every three years, thereafter. These inspections include checking the

liquid levels in the observation pipes and examination for any seepage around the filter.

3. Winter traffic on the filter is not permitted to avoid frost penetration and to minimize compaction.
4. A good water conservation plan within the house or establishment will help assure that the filter system will not be overloaded.

D. User's Manual: A user's manual is to accompany the single pass filter component. The manual is to contain the following as a minimum:

1. Diagrams of all system components and their location.
2. Specifications for electrical and mechanical components.
3. Names and phone numbers of local health authority, component manufacturer or management entity to be contacted in the event of a failure.
4. Information on the periodic maintenance of the single pass filter component, including electrical and mechanical components.
5. Notice that the dose chamber may fill due to flow continuing during pump malfunction or power outages. One large dose when the power comes on or when the pump is repaired may cause the dispersal system to have problems. In this situation, the pump chamber should be pumped by a licensed pumper before pump cycling begins or other measures shall be used to dose the component with only the proper amount of influent. This may include manual operation of the pump controls until such time the pump chamber has reached its normal level.

E. Performance monitoring must be performed on single pass filter components installed under this manual.

1. The frequency of monitoring must be:
   a. At least every six months for the first two years after installation. Then once a year for the next two years. Then once every three years, thereafter, and
   b. At times of problem, complaint, or failure.

F. The minimum criteria addressed in performance monitoring of single pass filter components are:

1. Type of use.
2. Age of system.
3. Type of container installed.
4. Nuisance factors, such as odors or user complaints.
5. Mechanical malfunction within the component including problems with valves or other mechanical or plumbing components.

6. Material fatigue or failure, including durability or corrosion as related to construction or structural design.
7. Neglect or improper use, such as overloading the design rate, poor maintenance of vegetative cover, inappropriate cover over the single pass filter component, or inappropriate activity over the single pass filter component.
8. Installation problems such as improper materials or location.
9. Pretreatment component maintenance, including dosing frequency, structural integrity, groundwater intrusion or improper sizing.
10. Pump chamber maintenance, including improper maintenance, infiltration, structural problems, or improper sizing.
11. Ponding in the single pass filter component, prior to the pump cycle, is evidence of development of a clogging mat or reduced infiltration rates.
12. Pump malfunction including dosing volume problems, pressurization problems, breakdown, burnout, or cycling problems.
13. Overflow or seepage problems, as shown by evident or confirmed sewage effluent, including backup if due to clogging.

G. Reports are to be submitted in accordance to Ch. Comm. 83, Wis. Admin. Code.

VII. REFERENCES

W.A. Cagle and L.A. Johnson 1994. "On-Site Intermittent Sand Filter Systems, A Regulatory/Scientific Approach to their Study in Placer County, California" ASAE Proceedings of the Seventh International Symposium on Individual and Small Community Sewage Systems.

EPA Design Manual 1980. "Intermittent Sand Filters" Onsite Wastewater Treatment and Disposal Systems, chapter 6.3

VIII. WORKSHEET

SINGLE PASS SAND FILTER WORKSHEET

A. Design wastewater flow (DWF)

One or Two-family Dwelling.

DWF = 150 gal/bedroom x # of bedrooms

= 150 gal/bedroom x _____# of bedrooms

= _____ gal/day

Public Facilities.

DWF = Sum of each wastewater flow per source per day x 1.5

= _____ gal/day x 1.5

= _____ gal/day

B. Distribution cell area

Calculate the distribution cell area by dividing the design wastewater flow (DWF) by design loading rate (DLR)of 1.25 gpd/ft^2

Distribution cell area = DWF ÷ 1.25 gpd/ft^2

= _____ gpd ÷ 1.25 gpd/ft^2

= _____ ft^2

C. Width and length of the distribution cell.

The width and length are determined by dividing the distribution cell area by a chosen dimension for either the width or length.

Width of distribution cell = distribution cell area ÷ chosen cell length

= _____ ft^2 ÷ _____ ft.

= _____ ft.

or

Length of distribution cell = distribution cell area ÷ chosen cell width

= _____ ft^2 ÷ _____ ft.

= _____ ft.

D. Location of observation pipes.

Distance from end of distribution cell to observation pipe = Length of distribution cell ÷ 6

= _____ ft. ÷ 6

= _____ ft.

E. Volume of a single dose.

Volume of a single dose ≤ number of orifices x 0.25 gal/dose

= _____ x 0.25 gal/dose

= _____ gal/dose

D. Number of doses per day.

Number of doses per day = DWF ÷ volume of single dose

= _____ gpd ÷ ____ gal/dose

= _____ doses/day

G. Time interval between pump start times

Time interval (hours) = 24 hrs/day ÷ Number of doses per day

= 24 hrs/day ÷ _____ doses/day

= _____ hours

Time interval (minutes) = 1440 minutes/day ÷ Number of doses per day

= 1440 minutes/day ÷ _____ doses/day

= _____ minutes

H. Surge capacity of the tank or chamber that houses the pump dosing the component

Surge capacity of zone 1 (between the "pump on" elevation and "alarm on" level).

Zone 1 = DWF ÷ 3 x 2

= _____ gal ÷ 3 x 2

= _____ gal

Surge capacity of zone 2 (between the "alarm on" level and the inlet of the tank or chamber).

Zone 2 = DWF ÷ 3

= _____ gal ÷ 3

= _____ gal

IX. EXAMPLE WORKSHEET

SINGLE PASS SAND FILTER WORKSHEET

A. Design wastewater flow (DWF)

One or Two-family Dwelling.

DWF = 150 gal/bedroom x # of bedrooms

= 150 gal/bedroom x 3 # of bedrooms

= 450 gal/day

Public Facilities.

DWF = Sum of each wastewater flow per source per day x 1.5

= _____ gal/day x 1.5

= _____ gal/day

B. Distribution cell area

Calculate the distribution cell area by dividing the design wastewater flow (DWF) by design loading rate (DLR)of 1.25 gpd/ft^2

Distribution cell area = DWF ÷ 1.25 gpd/ft^2

= 450 gpd ÷ 1.25 gpd/ft^2

= 360 ft^2

C. Width and length of the distribution cell.

The width and length are determined by dividing the distribution cell area by a chosen dimension for either the width or length.

Width of distribution cell = Distribution cell area ÷ chosen cell length

= 360 ft^2 ÷ 36 ft.

= 10 ft.

or

Length of distribution cell = Distribution cell area ÷ chosen cell width

= _____ ft^2 ÷ _____ ft.

= _____ ft.

D. Location of observation pipes.

Distance from end of distribution cell to observation pipe = Length of distribution cell ÷ 6

= 36 ft. ÷ 6

= 6 ft.

E. Volume of a single dose.

Volume of a single dose = distribution cell area x 0.08 gal/ft^2/dose

= 115 x 0.25 gal/dose

= 28.75 or 29 gal/dose

E. Number of doses per day.

Number of doses per day = DWF ÷ volume of single dose

= 450 gpd ÷ 29 gal

= 15.5 doses/day

G. Time interval between pump start times

Time interval (hours) = 24 hrs/day ÷ Number of doses per day

= 24 hrs/day ÷ _____ doses/day

= _____ hours

Time interval (minutes) = 1440 minutes/day ÷ Number of doses per day

= 1440 minutes/day ÷ 15.5 doses/day

= 92.9 or 90 minutes

H. Surge capacity of the tank or chamber that houses the pump dosing the component

Surge capacity of zone 1 (between the "pump on" elevation and "alarm on" level).

Zone 1 = DWF ÷ 3 x 2

= 450 gal ÷ 3 x 2

= 300 gal

Surge capacity of zone 2 (between the "alarm on" level and the inlet of the tank or chamber).

Zone 2 = DWF ÷ 3

= 450 gal ÷ 3

= 150 gal

X. PLAN SUMBITTAL and INSTALLATION INSPECTION

A. Plan Submittal

In order to install a component correctly, it is important to develop plans that will be used to install the component correctly the first time. The following checklist may be used when preparing plans for review. The checklist is intended to be a general guide. Conformance to the list is not a guarantee of plan approval. Additional information may be needed or requested to address unusual or unique characteristics of a particular project. Contact the reviewing agent for specific plan submittal requirements, which the agency may require that are different than the list included in this manual.

General Submittal Information

- Submittal of additional information requested during plan review or and questions concerning a specific plan must be referenced to the Plan Identification indicator assigned to that plan by the reviewing agency.
- Plans or documents must be permanent copies or originals.

Forms and Fees

- Application form for submittal, provided by reviewing agency along with proper fees set by reviewing agent.
- Onsite verification report signed by the county or appropriate state official.

Documentation

- Architects, engineers or designers must sign, seal and date each page of the submittal or provide an index page, which is signed, sealed and dated.
- Master Plumbers must sign, date and include their license number on each page of the submittal or provide an index page, which is signed, sealed and dated.
- Three completed sets of plans and specifications (clear, permanent and legible); submittals must be on paper measuring at least 8-1/2 by 11 inches.

PLOT PLAN

- Dimensioned plans or plans drawn to scale (scale indicated on plans) with parcel size or all property boundaries clearly marked.
- Slope directions and percent in component area.
- Benchmark and north arrow.
- Setbacks indicated as per appropriate code.
- Location information; legal description of parcel must be noted.
- Location of any nearby existing component or well.

PLAN VIEW

- Dimensions for single pass sand filter distribution cell(s).
- Location of observation pipes.
- Pipe lateral layout, which must include the number of laterals, pipe material, diameter and length; and number, location and size of orifices.
- Manifold/force main locations, with materials, length and diameter of each.

CROSS SECTION OF COMPONENT

- Lateral elevation, position of observation pipes, dimensions and depths of aggregates and sand, and type of cover material such as geotextile fabric, and depth, if applicable.

COMPONENT SIZING

- For one- and two-family dwellings, the number of bedrooms must be included.
- For public facilities, the sizing calculations must be included.

TANK AND PUMP INFORMATION

- All construction details for site-constructed tanks.
- Size and manufacturer information for prefabricated tanks.
- Notation of pump or siphon model, pump performance curve, friction loss for force main and calculation for total dynamic head.
- Cross section of tank / chamber to include storage volumes; connections for piping, vents, and electricity; pump "off" setting; dosing cycle and volume; and location of vent and manhole.
- Cross section of two compartments tanks or tanks installed in a series must include information listed above.

OTHER

- For design flows greater than 1000 gpd, include the manufacturer, model, and location of a metering device, which accurately meters the amount of effluent entering the component.

B. Inspections.

Inspection shall be made in accordance with ch. 145.20,. Wis. Stats and s. Comm 83.26, Wis. Adm. Code. The inspection form on the following two pages may be used. The inspection of the component installation and/or plans is to verify that the component at least conforms to specifications listed in Tables 1-3 of this manual.

GENERAL INFORMATION		ISF INFORMATION
Permit Holders Name:	County:	ISF outside dimensions:
VRP Elevation:	Sanitary Permit Number:	Orifice position:
VRP Description:	Plan ID Number:	Sand source:
Inspector Name & License #:	Parcel Tax Number:	Forcemain length:
Dates Inspected:		Forcemain diameter:

CONTRACTOR INFORMATION	
Plumber Name:	Phone #:
Electrician Name:	Phone #:
Excavator Name:	Phone #:

ELEVATION DATA				
STATION	BS	HI	FS	ELEV
VRP:				
STFM:				
STFM End:				
SFPB FM:				
SFPB FM End:				
Base of STPB:				
Base of SFPB:				
STFM pitch:				

TANK INFORMATION	
Manufacturer:	Gallons/inch
Tank Capacity:	
Capacity of First Compartment:	
Capacity of Second Compartment:	

SEPTIC TANK VAULT	
Inside height:	Inches
*Alarm/timer override:	Inches
*Timer off:	Inches
*Red. Off/low level alarm:	Inches
Forcemain Diameter:	Inches
Forcemain Length:	Feet

* Measured from bottom of tank cover.

PUMP INFORMATION		
	DTPB	SFPB
Manufacturer:		
Model Number:		
Lift:		
Friction Loss:		
System Head:		
As-Built TDH:		
System Demand:		

OPERATIONAL REVIEW		
STPB floats tested	Yes	No
SFPB floats tested	Yes	No
Distribution pipes flushed	Yes	No
As-built TDH below pump curve	Yes	No
Septic tank tested for water tightness	Yes	No
Owner issued operational manual	Yes	No
Residual head at start up		
Programmable timer settings	On	Off

ADMINISTRATIVE REVIEW		
Revision to plans required	Yes	No
Construction directive issued	Yes	No
Construction order issued	Yes	No
Date of directive		
Directive deadline		
Enforcement order date		
Enforcement order deadline		
Date compliance issued		

DTPB – Dose Tank Pump Basin
SFPB – Sand Filter Pump Basin
SFPB FM - Sand Filter Pump Basin, Force Main
STFM – Septic Tank Force Main
STPB – Septic Tank Pump Basin
VRP- Vertical Reference Point

DEVIATIONS FROM APPROVED PLANS:

Date Installation Approved _____ **Inspector Signature** _____

Alice Clausing

WISCONSIN STATE SENATOR

August 30, 1999

Brenda J. Blanchard, Secretary
Wisconsin Department of Commerce
P.O. Box 7970
Madison, WI 53707

Re: Clearinghouse Rule 98-083
Request for Modifications

Dear ~~Secretary Blanchard~~ Brenda:

Please be advised that pursuant to section 227.19(4)(b)2, Wis. Stats. the Senate Committee on Agriculture, Environmental Resources and Campaign Finance Reform is recommending that the Department consider the recommendations for modification to CR 98-083 as contained in the attached Motion.

If you have any questions please feel free to contact Bill Wenzel of my staff. We are looking forward to working with you to resolve the outstanding concerns and expedite the promulgation of this Rule. To that end, we will look forward to talking with you in the near future.

Sincerely,

Alice Clausing
State Senator - 10th District

Cc: Senate Chief Clerk
Rep. Johnsrud – Assembly Committee on Natural Resources
Sen. Robson - Joint Committee on Review of Administrative Rules
Rep. Grothman – Joint Committee on Review of Administrative Rules
Committee Clerk files

State Capitol, P.O. Box 7882, Madison, WI 53707-7882
1-800-862-1092 Toll-Free ■ 608-266-7745 Madison ■ 715-232-1390 Menomonie

August 30, 1999

MOTION OF THE SENATE COMMITTEE ON AGRICULTURE, ENVIRONMENTAL RESOURCES AND CAMPAIGN FINANCE REFORM

MOVED as follows:

1. The Senate Committee on Agriculture, Environmental Resources and Campaign Finance Reform, pursuant to s. 227.19 (4) (b) 2., requests that the Department of Commerce consider modifications to Clearinghouse Rule 98-083 to do all of the following:

a. Incorporate the descriptions of and design requirements for all allowable types of privately owned waste treatment systems in the rule.

b. Establish a process and criteria for proposing new allowable types of privately owned waste treatment systems, to include rule promulgation.

c. Establish a process and criteria for approving experimental privately owned waste treatment systems, to include requirements for the monitoring of the system's functioning and performance.

d. Create additional mechanisms to ensure that inspection and maintenance requirements are fulfilled.

e. Further delay the implementation of appropriate provisions of the rule to allow for evaluation and enhancement of local planning and zoning and for county preparation and staff training.

f. Develop methods for ambient monitoring to obtain information on compliance with groundwater standards by privately owned waste treatment systems.

g. Maintain the policy that a holding tank is the system design of last resort.

h. Establish a mechanism, in cooperation with the Department of Natural Resources, to respond to changes in, and ensure continued compliance with, state groundwater regulations and federal drinking water regulations.

2. The Committee recognizes that the proposed rule is very complex and that many other issues have been presented to and discussed by the Committee. Pursuant to this modification request, the Committee will continue to discuss the proposed rule and anticipates that further proposals for modifications may be made by the Committee or the Department of Commerce.

3. If the Department of Commerce by 4:00 p.m. on August 31, 1999 does not agree, in writing, to consider modifications to Clearinghouse Rule 98-083, the Senate Committee on Natural Resources, pursuant to s. 227.19 (4) (d) 6., Stats., objects to the rule in its entirety on the grounds that the proposed amendment is arbitrary and capricious and imposes an undue hardship.

Table 81.20-11

NSF	NSF International 3475 Plymouth Road P.O. Box 130140 Ann Arbor, Michigan 48113-0140
Standard Reference Number	**Title**
1. Standard 14-90	Plastic Piping Compounds and Related Materials
2. Standard 40-99	Residential Wastewater Treatment Systems
3. Standard 41-98	Non-Liquid Saturated Treatment Systems

Table 81.20-12

STI	Steel Tank Institute 570 Oakwood Road Lake Zurich, Illinois 60047
Standard Reference Number	**Title**
STI-P_3	External Corrosion Protection of Underground Steel Storage Tanks, Specifications and Manual for, 1996 edition

Table 81.20-13

UL	Underwriters Laboratories Inc. 333 Pfingsten Road Northbrook, Illinois 60062
Standard Reference Number	**Title**
1. Standard 58-86	Steel Underground Tanks for Flammable and Combustible Liquids
2. Standard 1746-89	External Corrosion Protection Systems for Steel Underground Storage Tanks

Table 81.20-14

WQA	Water Quality Association 4151 Naperville Road Northbrook, Illinois 60062
Standard Reference Number	**Title**
S-100-85	Household, Commercial and Portable Exchange Water Softeners

(a) A POWTS owned by the federal government and located on federal lands; and

(b) A POWTS located or to be located on land held in trust by the federal government for Native Americans.

(3) SUBDIVISION STANDARDS. This chapter does not establish minimum lot sizes or lot elevations under s. 145.23, Stats., for the purpose of the department reviewing proposed subdivisions which will not be served by public sewers under s. 236.12, Stats.

Comm 83.03 APPLICATION. (1) INSTALLATIONS. (a) New POWTS installations. The design, installation and management of a new POWTS shall conform with this chapter.

Note: Pursuant to s. 145.135 (2) (b), Stats., the approval of a sanitary permit is based on the rules in effect on the date of the permit approval.

(b) Modifications to existing POWTS. A modification to an existing POWTS, including the replacement, alteration or addition of materials, appurtenances or POWTS components, shall require that the modification conform to this chapter.

Note: The modification of one part of a POWTS may affect the performance or the operation of other parts of the POWTS thereby necessitating further modifications for the 'other parts' to be or remain compliant with the appropriate edition of the state plumbing code; see sub. (2) (b) 1.

(c) Modifications to existing structures served by existing POWTS. When an addition or alteration is proposed to an existing building, structure or facility that is served by an existing POWTS and the proposed addition or alteration will result in a change that affects the wastewater flow or wastewater contaminant load beyond the minimum or maximum capabilities of the existing POWTS, the POWTS shall be modified to conform to the rules of this chapter.

Note: See s. Comm 83.25 (2) relating to the issuance of building permits.

(2) RETROACTIVITY. (a) This chapter does not apply retroactively to an existing POWTS installed or for which a sanitary permit has been issued prior to [the effective date of this chapter . . . revisor to insert effective date], except as provided in ss. Comm 83.32 (1) (a) and (c) to (g), 83.54 (4) and 83.55 (1) (b).

(b) 1. Except as provided in subd. 2. and ss. Comm 83.32 (1) (a) and (c) to (g), 83.54 (4) and 83.55 (1) (b), an existing POWTS installed prior to [the effective date of this chapter . . . revisor to insert effective date], shall conform to the siting, design, construction and maintenance rules in effect at the time the sanitary permit was obtained or at the time of installation, if no sanitary permit was issued.

2. a. An existing POWTS installed prior to December 1, 1969 with an infiltrative surface of a treatment and dispersal component that is located 2 feet or more above groundwater or bedrock shall be considered to discharge final effluent that is not sewage, unless proven otherwise.

(3) SOIL COLOR PATTERN EXEMPTIONS. (a) Without filing a report under s. Comm 85.60 (2), a certified soil tester may discount the following conditions, not limited by enumeration, as indicators of seasonally saturated soil:

1. Fossilized soil color patterns formed by historic periodic soil saturation.

2. A soil profile that has an abrupt textural change, consisting of silt loam or finer textures overlying at least 4 feet of unsaturated loamy sand or coarser textured soil and 24 inches or less of periodically saturated soil immediately above the coarser material.

3. Redoximorphic features orientated along old or decayed root channels.

4. Residual sandstone colors.

5. Unevenly weathered glacially deposited material, glacially deposited material naturally gray in color, or concretionary material in various stages of decomposition.

6. Deposits of lime.

7. Light colored silt or fine sand coatings on soil ped surfaces.

(b) Without filing a report under s. Comm 85.60 (2) for a specific site, the department may accept the results of soil saturation determinations or of the hydrograph procedure under s. Comm 85.60 previously conducted for areas adjacent to the site, provided that the soil profile descriptions and interpretations confirms that the soil and site conditions are similar for the specific site and the adjacent areas.

(4) SOIL COLOR PATTERN REPORTS. The certified soil tester shall report and describe any soil color pattern exemptions encountered.

(5) DETERMINATION REQUESTS. A certified soil tester may request a determination by the governmental unit or department staff on the significance of unusual soil color patterns as indicators of soil saturation that may not indicate saturated soil conditions that will interfere with wastewater treatment. The governmental unit or department may decline to make such determinations, and defer to the use of soil saturation determinations pursuant to s. Comm 85.60 or some other method to make a determination.

Comm 85.40 EVALUATION REPORTS. (1) GENERAL. A soil evaluation report shall be prepared and submitted to the governmental unit having jurisdiction upon the completion of the evaluation and associated report form.

(2) SOIL REPORT CERTIFICATION AND FORMAT. (a) Soil evaluation reports. Soil evaluation reports shall be prepared in a format specified by the department and this chapter.

Note: Soil evaluation report forms in an acceptable format are available from the Safety and Buildings Division, P.O. Box 7162, Madison, WI 53707-7162.

(b) A privy may be installed in the floodfringe provided that the area is filled to remove it from the floodfringe designation or the vault is flood-proofed.

Note: The department of natural resources determines if filling or flood-proofing is in accordance with current rules in effect for development in a floodfringe area.

Comm 91.13 PORTABLE RESTROOMS. (1) The storage chamber of a portable restroom into which human waste is to be deposited shall be watertight.

(2) The entire floor and the side walls to a height of not less than 4 inches of a portable restroom shall be of a material impervious to water.

Comm 91.20 INCORPORATION OF STANDARDS BY REFERENCE. (1) CONSENT. Pursuant to s. 227.21, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the standards listed in sub. (4).

(2) COPIES. Copies of the adopted standards are on file in the offices of the department, the secretary of state and the revisor of statutes. Copies of the standards may be purchased through the respective organizations listed in sub. (3).

(3) ADOPTION OF STANDARDS. The standards referenced in pars. (a) and (b) are hereby incorporated by reference into this chapter.

(a) American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018, GAS-FIRED TOILETS, Z21.61-1983.

(b) NSF International, 3475 Plymouth Road, P.O. Box 130140, Ann Arbor, Michigan 48113-0140, NON-LIQUID SATURATED TREATMENT SYSTEMS, NSF 41-1998.

Chapter Comm 91
Appendix

The material and information contained in this appendix is for clarification purposes only. Appendix material and information are numbered to correspond to the rule number as it appears in the text of the code. Material and information included in this appendix is subject to change without notice, including names, addresses, phone numbers and forms, and reflects information known at the time of publication.

A-91.10 (3) (b) Section Comm 82.31 (16) (a) to (f) reads as follows:

82.31 (16) VENT TERMINALS. All vents and vent systems shall terminate in the open air in accordance with this subsection.

(a) Extension above roofs. Extensions of vents through a roof shall terminate at least 8 inches above the roof. Where the roof is to be used for any purpose other than weather protection, the vents shall extend at least 7 feet above the roof.

Wisconsin
Department of Commerce

Madison, Wisconsin 53707
(608) 266-1018
TDD #: (608) 264-8777
www.commerce.state.wi.us

Tommy G. Thompson, Governor
Brenda J. Blanchard, Secretary

August 17, 1999

AUG 18 RECD

The Honorable Alice Clausing
Senate Committee on Agriculture and Environmental Resources
100 North Hamilton Room 308
Madison, Wisconsin 53703

Dear Senator Clausing:

The Department of Commerce would like to make a germane modification to Clearinghouse Rule No. 98-083, relating to private onsite wastewater systems. This modification is be submitted under section 227.19 (4) (b) 3., Stats.

The modification consists of:

- correcting the title of the referenced standard NSF 40 under Table 81.20-11
- correcting a typographical error in section Comm 83.03 (2) (b) 2. a. with the insertion of the word "not" in the third line between "is" and "sewage".
- correcting an inappropriate cross reference in section Comm 85.30 (5) by eliminating the reference to s. Comm 83.43 (7).
- updating to a new edition of the referenced standard NSF 41 under Table 81.20-11 and s. Comm 91.20 (3) (b).

Pages 50, 57, 127 and 143 of the rule draft should be replaced with the attached pages.

Thank you for your assistance in this matter.

Sincerely,

Brenda Blanchard
Secretary

Mason, Cory
From: Flury, Kelley
Sent: Thursday, September 02, 1999 8:27 AM
To: Mason, Cory
Subject: FW: Comm 83

Cory: Do you have a Comm 83 file you can put this in?

-----Original Message-----

From: **Patanpat2@aol.com [mailto:Patanpat2@aol.com]**
Sent: Tuesday, August 31, 1999 9:54 PM
To: Sen.Robson@legis.state.wi.us
Subject: Comm 83

Comm 83 would allow rural home owners to use high tech septic systems to replace their failing old systems. The Wisconsin Alliance for Cities, the 1000 Friends of Wisconsin, and the League of Municipalities are doing everything in their power to make the approval of incorporating these new systems as difficult and expensive for the home owner as possible. They claim they are interfering to protect the water supply, but they are really just concerned about the growth of cities and the prevention of growth in rural areas. I don't care if they want to put up all kinds of obstacles to urban sprawl, but I do care about the noose they are trying to put around the necks of the present home owners in rural Wisconsin who have existing older homes with failing septic systems. Many of these homes are crowded together in small hamlets in high water or poor soil absorption areas. Their properties won't support any of the old style systems allowed other than holding tanks, so they are limping along with old near failed systems. What is this doing to the water supply? Wouldn't it be better to let these owners replace their old systems with new technology systems that would work on these properties? The opponents of Comm 83 say "no" so they can prevent urban sprawl. Where is the common sense? Let rural home owners replace their septics!

One very extreme but very unfortunate result of this holdup of Comm 83 is what happened to Helenville, WI. Helenville is a very nice hamlet just six miles east of Jefferson, WI. Helenville has only 110 homes including a few mom and pop businesses. Many of the homes are old and on small lots and are built on land with a high water table. Many of the septics will need replacement in the next few years. Since the new technology systems are not yet allowed, engineers from Madison told this small community that building a treatment plant was the only and best way for Helenville to protect their water supply. $400,000 later, Helenville had plans for a $3.8 Million dollar facility that was not eligible for grants and was therefore unfundable. So now the community of 110 owes $400,000 and still has their old septics. That's $3,636. plus interest per homeowner that could have been spent on new septics or college expenses or new roofs or retirement. What a shame! And all because Comm 83 opponents don't want new technology septics that could allow new development in the country. Please don't let this happen to any other community!

Pat Williams
W3177 Depot Road
Helenville, WI 53137
414-593-8792

Wisconsin
Department of Commerce

P. O. Box 7970
Madison, Wisconsin 53707
(608) 266-1018
TDD #: (608) 264-8777
www.commerce.state.wi.us

Tommy G. Thompson, Governor
Brenda J. Blanchard, Secretary

August 17, 1999

The Honorable DuWayne Johnsrud
Room 323 North, State Capitol
Madison, Wisconsin 53703

Dear Representative Johnsrud:

The Department of Commerce would like to make a germane modification to Clearinghouse Rule No. 98-083, relating to private onsite wastewater systems. This modification is be submitted under section 227.19 (4) (b) 3., Stats.

The modification consists of:

- correcting the title of the referenced standard NSF 40 under Table 81.20-11
- correcting a typographical error in section Comm 83.03 (2) (b) 2. a. with the insertion of the word "not" in the third line between "is" and "sewage".
- correcting an inappropriate cross reference in section Comm 85.30 (5) by eliminating the reference to s. Comm 83.43 (7).
- updating to a new edition of the referenced standard NSF 41 under Table 81.20-11 and s. Comm 91.20 (3) (b).

Pages 50, 57, 127 and 143 of the rule draft should be replaced with the attached pages.

Thank you for your assistance in this matter.

Sincerely,

Brenda Blanchard
Secretary

COMM 83 FINAL ENVIRONMENTAL IMPACT STATEMENT
ERRATA

Page

v Appendix D: Chloride Discharges From Residential Water Softeners

ix 2nd paragraph, Strike 2nd sentence and replace with "They are replaced with standards and procedures for approvals that are intended to allow more flexibility in authorizing new technology."

3rd paragraph, "~~Six~~ Nine design manuals will published with the code. These include.. ~~and Intermittent Sand Filter Component~~ Intermittent Sand Filter Component, Recirculating Sand Filter Component, Split-bed Recirculating Sand Filter Component, and Drip Irrigation Component."

2 3rd paragraph. Strike all sentences after second sentence.

3 Delete "• Allow surface discharge for confined waters."

15 4th paragraph "Periodic maintenance and inspection is one of the ..."

25 First sentence under section 2.6 should read "...serving approximately 30% of the state's housing units.

36 2nd paragraph "During the last two decades, the low point for total sanitary permit issuance was 1982 (11,183).

49 In Table 2-6, notes (a) and (b) should be reversed.

58 5th full paragraph, delete reference to Table 2-6.

59 Map 2-15 "Holding Tanks as Percentage of New Residential Systems, 1991-1997.

63 1st paragraph replace sentence beginning with "This is because Racine County ..." with "These are frequently replaced with an A+4 mound system. Further down in same paragraph, replace "suitable areas for conventional systems" with "areas suitable under the current code".

69 3rd full paragraph, "Under ~~the~~ this recent policy, ...

80 3rd full paragraph, "...Chloride Discharges from Residential Water Softeners, ..."

84 1st paragraph under section 3.2.2 "The Department's Uniform Dwellings code ..."

85 2nd paragraph under section 3.2.4, delete reference "(see Chapter 2, section 2.5)".

102 Under section 4.5.1, 3rd paragraph, add reference DNR 1995a.

104 3rd paragraph "For additional information, readers are referred to the report ... (1995a)."

104 Section 4.5.3, correct reference (DNR 1995a:90).

135 1st paragraph, 1st sentence should refer to Appendix A, not B. In sentence 4, it is Vilas

158 2nd paragraph from the bottom, "A system with less than 2 ft. of vertical separation is presumed not to comply with code ~~the final effluent quality~~ standards...

159 1st paragraph, "... sponsor legislation ~~the~~ that would divide ..."

160 Section 5.3.3 4th bullet, strike entire bullet starting with "the discharge of wastewater ..."

161 4th paragraph, "incorporates by reference ~~six~~ nine component manuals..." "At present, component manuals have been produced for...~~single pass sand filters, and holding tanks~~ single pass sand filters, recirculating sand filters, split-bed recirculating sand filters, drip irrigation, and holding tanks."

163 6th full paragraph, "the infiltrative surface of a dispersal component or treatment component consisting in part of *in situ* soil be located at least ~~12~~ 24 inches above the estimated high groundwater elevation or bedrock. This in effect establishes a minimum vertical separation distance of ~~12~~ 24 inches."

164 1st paragraph, "...most soils are recognized as having the capability to ~~treat coliform bacteria to a level of less than 200 bacteria per 100 ml of effluent~~ effectively protect groundwater resources from bacterial contamination with 36 inches of unsaturated soil."

164 Strike paragraph reading "The indicator for treatment capability..." and replace with "Fecal coliform bacteria in soil have been widely used as an indicator of treatment capability. A soil treatment component consisting of 36 inches of unsaturated soil is generally assumed to effectively remove fecal coliform bacteria from septic tank effluent. Soils with a texture of loamy coarse sand or coarse sand require at least 60 inches for effective removal of bacteria. Soils with more than 35% coarse fragments by volume are not assumed to effectively remove bacteria Effluent that has been pretreated to less than 10,000 fecal coliform bacteria per 100 ml can be safely discharged to a 24 inch depth of unsaturated soil."

181 5th paragraph, "A system designed to discharge ~~of~~ any effluent ..."

186 2nd paragraph, "...experiments are approved ~~internally~~ by the Department, with input from a Technical Advisory Group consisting of external members and Department staff,..."

187 1st paragraph, "The WCCA proposal does not address responses to violations ... "

187 Strike the 5th and 6th paragraphs and replace with "The proposed code establishes a range of responses to the attainment or exceedence of NR 140 groundwater standards at a point of standards application. It prohibits the discharge of wastewater to a system that will result in the exceedence of an applicable NR 140 standard at a point of standards application. It also defines sewage as wastewater containing 200 or more fecal coliform bacteria per 100 ml. Any system demonstrated to discharge sewage from the end of the most downstream treatment component is considered a failing system.

Any system approved either through a component manual or individual engineered system plan review is subject to compliance with NR 140 groundwater standards at a point ot standards application and to the determination of whether its final effluent is sewage. Specfic final effluent quality standards are not necessary given that all activities, practices, and facilities regulated by any state agency must provide compliance with groundwater standards.

188 Strike 1st paragraph beginning with "insufficient data to conclusively ..."

190 6th paragraph, "~~These~~ This land could also ....."

Last paragraph, "...a minimum ~~12~~ 24 inch vertical separation..."

195 1st full paragraph, "... some degree of skepticism about ~~less~~ rules that are perceived ..."

198 1st paragraph, "The rule proposes recognizes ~~seven~~ nine pre-approved component types:...~~filters, and holding tanks~~ filters, split-bed recirculating sand filters, drip irrigation, and holding tanks. Mounds would be allowed with a minimum of six inches *in situ* soil, but would require 36 inches total vertical separation if ~~used~~ they received untreated .... "

198 4th paragraph, "...mound systems, and drip irrigation components."

204 Section 5.6.1 3rd paragraph, "... the localized short-term disturbances and impacts to the environment, ~~mainly short-term~~, caused by system installation, ..."

219 Sub-alternative "Allow surface discharge for confined waters such as absorption ponds" should be removed.

220 Row 4, Column 2, "...Stats., with review by Technical Advisory Group."

223 Row 2, Column 4, Strike all text and replace with "Required to comply with NR 140 enforcement standards and preventive action limits at a point of standards application, except for nitrate standards and chloride preventive action limit."

223 Row 2, Column 5, Strike all text and replace with "Recognizes by rule the requirements of ch. 160, Stats."

224 Row 3, Column 4, Strike all text and replace with "Allows minimum vertical separation of 24 inches for pre-treatment components demonstrated to consistently produce effluent with <10,000 fecal coliforms per 100 ml."

228 Row 3, Column 5, Strike "the final effluent quality standard."

BEFORE THE
WISCONSIN DEPARTMENT OF COMMERCE

RECORD OF DECISION PURSUANT TO SECTION COMM 107.09 WIS. ADM. CODE

WISCONSIN ENVIRONMENTAL POLICY ACT COMPLIANCE FOR THE PROPOSED CHAPTER COMM 83, WIS. ADM. CODE, AND RELATED CODES

The Wisconsin Environmental Policy Act (WEPA) (Section 1.11, Wis. Stats.) requires all agencies of the state to prepare an Environmental Impact Statement (EIS) and include the same in every recommendation or report on proposals for legislation and other major actions significantly affecting the quality of the human environment. The Wisconsin Department of Commerce (the Department) has prepared an EIS for the revision of administrative rules commonly known as the plumbing code that address private onsite wastewater treatment systems (POWTS). The affected plumbing rules addressed in this document are Chapters Comm 83, 85 and 91, Wis. Adm. Code. The revision of these administrative rules is the project (the Project). The final EIS is being forwarded to the legislative committees under separate cover.

FINDINGS OF FACT

1. The purpose of the Project in this matter is to ensure that a safe and effective onsite sewage system design is available for any buildable site in Wisconsin.

2. Section 145.02, Wis. Stats., establishes the powers of the Department to regulate plumbing. The statutory powers provide that: (1) the Department shall regulate the construction, installation and maintenance of plumbing in connection with all buildings in this state, including buildings owned by the state or any political subdivision thereof; (2) the Department shall use these powers to ensure that such plumbing shall be safe, sanitary and installed and maintained in a manner such as to safeguard the public health and the waters of the state; and (3) the Department shall have general supervision of all such plumbing and shall after public hearing prescribe and publish and enforce reasonable standards therefor which shall be uniform and of statewide concern so far as practicable.

3. Under Section 145.02(3)(d), Wis. Stats., the Department may prepare and cause to be printed such rules, bulletins or other documents as may be necessary and furnish copies thereof to those engaged in the plumbing business and to the public upon request.

4. One mechanism of the Department to fulfill this statutory responsibility has been the promulgation of the state plumbing rule, Chapters Comm 81-87, Wis. Adm. Code.

5. The current Chapter Comm 83, Wis. Adm. Code, of the plumbing rule establishes prescriptive minimum standards for the design, installation, inspection, and maintenance of specific types of onsite sewage systems. Types of systems not specifically recognized in the rule cannot be approved for general use.

6. The current Chapter Comm 83, Wis. Adm. Code, and related rules have not been fully revised since 1980.

7. The Department is required by Section 160.19, Wis. Stats., to review its rules for compliance with the groundwater protection standards promulgated in Chapter NR 140, Wis. Adm. Code.

8. The Department has submitted a hearing draft of proposed rules relating to private onsite wastewater treatment systems (POWTS) to the public.

9. The Department has taken the following actions required by Chapter Comm 107, Wis. Adm. Code, and Section 1.11, Wis. Stats.

   a. On September 9, 1996, the Department issued a public notice announcing its intention to prepare an EIS and soliciting public comments on the scope of the EIS for the proposed Chapter Comm 83, Wis. Adm. Code, and related rules. The notice also announced the public hearings for the scoping process.

   b. On September 30, 1996, the Department held a public hearing in Madison to solicit public comments on the scope of the EIS for the project.

   c. On October 3, 1996, the Department held a public hearing in Chippewa Falls to solicit public comments on the scope of the EIS for the project.

   d. On October 15, 1996, the public comment period on the scope of the EIS ended. Comments were received from the Department of Natural Resources, county agencies, environmental groups and individuals. These are summarized in Section 1.4 of the EIS.

   e. On July 11, 1997, the Department issued the "Notice of Availability of Draft Environmental Impact Statement" soliciting public comments, and comments from interested state agencies, on the draft EIS. The notice also announced the public hearings on the draft EIS.

   f. Three public hearings on the draft EIS were held: on August 6, 1997 in Rice Lake, on August 8, 1997 in Green Bay, and on August 19, 1997 in Madison.

   g. On September 2, 1997, the public comment period on the draft EIS ended.

   h. The Department reviewed and considered the comments on the draft EIS and comments on the rule draft and decided to make substantive changes in the proposed rules and to prepare a new draft EIS for the newly revised regulations.

   i. On June 8, 1998, the Department issued the "Notice of Availability of Draft Environmental Impact Statement" soliciting public comments, and comments from interested state agencies, on the draft EIS. The notice also announced the public hearing on the draft EIS. One paragraph concerning hearings on the rule had been omitted by the newspaper and on June 11, 1998, a corrected notice was published.

j. On July 13, 1998, a public hearing on the draft EIS was held in Madison.

k. On July 22, 1998, the public comment period on the draft EIS ended.

l. On August 26, 1998, the Department issued the "Notice of Availability of Final Environmental Impact Statement" soliciting public comments, and comments from interested state agencies, on the final EIS. The notice also announced the public hearing on the final EIS.

m. On September 28, 1998, a public hearing on the final EIS was held in Madison. This hearing was conducted in the same manner as a contested case proceeding pursuant to Section Comm 107.08, Wis. Adm. Code, to receive public comments and to allow for cross examination of the EIS project manager. There were seven hearing attendees. A list of attendees is included as Attachment A. Given the nature of this proceeding as a public hearing, no person or organization attending such proceeding was deemed to be a party for any administrative purpose.

n. On October 9, 1998, the public comment period on the final EIS ended.

o. The Department has received comments on the draft EIS and final EIS. The comprehensive response to the comments on the draft EIS is included as Appendix H to the final EIS. The comments on the final EIS and the Department's response are attached as Attachment B to this record of decision.

10. The Department has reviewed and considered the draft EIS and final EIS, the comments on those documents, the hearing transcripts from the public hearings on the draft EIS and final EIS, and the comprehensive written responses to public and agency comments. In response to these comments, revisions have been made in the rule.

11. The Department finds that properly functioning POWTS as approved under the current rule are not a risk to public health. The proposed rule will require equal or better treatment of domestic wastewater as the current rule.

12. Failing POWTS may pose a risk of contamination of groundwater and surface waters and may create surface ponding conditions that are a risk to public health. Compared to the current rule, the proposed rule provides additional measures for maintenance and enforcement to minimize failures.

13. The proposed rule contains a range of responses the Department may undertake if exceedences of groundwater standards are found. Any type of POWTS may have incidental exceedences of groundwater standards. These are not expected to result in significant adverse impacts to groundwater quality.

14. The proposed rule, like the current rule, does not set a standard for nitrate removal. Section 160.255, Wis. Stats., excepts private sewage systems from nitrate standards. The proposed rule acknowledges local government authority under Section 59.69, Wis. Stats., to enact more restrictive ordinances for nitrate removal. The proposed rule will reference at the time of promulgation at least one component manual which includes nitrate removal.

15. During construction of POWTS under the proposed rule, like the current rule, short-term, localized adverse impacts of soil erosion and land cover alteration are expected. The erosion control requirements of the Department's Uniform Dwellings rule, Chapters Comm 21 - 28, Wis. Adm. Code, will minimize these impacts.

16. The proposed rule will allow treatment methods that overcome site restrictions imposed by the current rule. Thus the proposed rule will provide more flexibility for siting construction in unsewered areas where such construction is permitted by local zoning ordinances.

17. The proposed rule will allow homeowners to use wastewater treatment systems on new sites which, under the current rule, would be restricted to holding tanks.

18. Construction in unsewered areas may result in significant adverse environmental impacts to the extent that these are not avoided by effective local land use planning and zoning. These impacts can occur under both the proposed and the current rule. They are discussed in the final EIS.

19. The proposed rule is estimated to increase by 8.9 million acres the area of land suitable for onsite wastewater treatment systems other than holding tanks statewide. This land is dispersed in varying sized units across the state and is interspersed with land that is suitable under the current rule.

20. The Department understands that there are conflicting views over whether the proposed rule will increase development statewide relative to the development that would occur under the current rule. The Department finds that these are adequately addressed in the final EIS.

21. The Department understands that there are conflicting views over whether increased development is beneficial or adverse.

22. The Department finds that there is no reasonable basis for expecting that the proposed rule will result in an increase in development statewide. The Department finds no evidence of a statewide shortage of developable land under the current rule. The Department finds that unsewered development is currently occurring in all parts of the state because pockets of adequate soils for technology recognized under the current rule are interspersed with areas of inadequate soils. The Department finds that previous changes in POWTS technologies have not led to increased development. The Department acknowledges that development patterns could shift in specific areas where demand is high, land suitable under the current rule is in short supply, and the supply of land will be increased due to the proposed rule.

23. The Department finds that POWTS regulation has been neither the driving, nor the limiting, determinant of the patterns and rates of statewide land use and development.

24. Compared to the current rule, the proposed rule will require increased expertise in those who administer the rule.

CONCLUSION OF LAW

1. The final EIS for Proposed Changes to Chapters Comm 83, 85 and 91, Wis. Adm. Code, regulating Private Onsite Wastewater Treatment Systems (POWTS) was prepared in a manner that satisfies the requirements of Chapter Comm 107, Wis. Adm. Code, and Section 1.11, Wis. Stats.

FINAL DECISION

Decision

Pursuant to Section 227.19, the Department has decided to forward for the required legislative committee review and approval the "Rules in Final Draft Form, Chapters Comm 83, 85 and 91, Relating to Private Onsite Wastewater Treatment Systems, Clearinghouse Rule No 98-083 (the proposed rule)." The proposed rule is being forwarded to the legislative committees under separate cover.

In response to comments received, there have been minor revisions in these rules since the final EIS was completed (see Revisions to the Hearing Draft of the Proposed Rule, p. 5). None of these revisions make a significant difference in the environmental impacts discussed in the final EIS, but some revisions do provide additional mitigations for perceived burdens on local regulators.

The Department has determined that the proposed rule best meets the Department's intent and mandate.

Discussion

Pursuant to Section 145.02, Wis. Stats, the Department may determine acceptable procedures for evaluating, approving, maintaining, and otherwise regulating new technologies for private on-site wastewater treatment systems (POWTS). These procedures should be updated periodically to take into account changes in the industry and in the construction environment.

The current rule has not been updated substantially since 1980. Under the current rule, many existing POWTS technologies are not recognized for new construction. This approach disregards scientific studies and field experience that shows these technologies to be at least as protective, and in some cases more protective, of human health, groundwater and the environment than those technologies currently permitted. There is no rational basis to differentiate, in terms of health and environmental protection, between these technologies and those generally permitted under the current rule. It is not reasonable to deny homeowners in the state the use of safe and effective technologies.

Furthermore, many of these non-codified technologies are already in use across the State. In most cases, they have been used as replacement systems, and in others, as experimental systems. There is no rational basis for allowing these technologies as replacements, yet denying them for new construction.

The Department understands that one purpose of POWTS regulation is to ensure that there is a safe and effective POWTS design available for any permitted building site in the State. The current rule limits the Department's ability to accomplish this goal. The current rule provides no mechanism for recognizing new technology other than separate, individual rulemaking and an accompanying environmental impact statement (EIS). This approach is inefficient and unduly burdensome.

A second purpose, clearly stated in Section 145.02, Wis. Stats., is to protect the waters of the state. The Department of Natural Resources has set groundwater standards. The Department's proposed rule requires technologies to satisfy those standards. Under the proposed rule, new technologies can be approved if they can be demonstrated to satisfy those standards.

It is the Department's understanding from comments received during this process that some people believe that POWTS regulation should serve a third purpose: to limit where people can locate construction. The Department does not believe that limiting POWTS technology provides effective, reasonable, or predictable land use control. Land use planning, development restrictions, etc., are not matters that can be reasonably or consistently controlled by onsite sewage system regulations. Nor has the legislature required or administration asked the Department to use these rules to block construction on land zoned or permitted as residential. Development and land use controls are matters that should be determined by the reasoned public deliberations of appropriate legislative and municipal bodies.

Revisions to the Hearing Draft of the Proposed Rule

Minor revisions have been made in the proposed rule since the final EIS was completed. The revisions include:

Additions

1) definitions of *in situ* soil, camping unit transfer container, linear loading rate, and disinfection units;
2) required Department approved training for inspectors and installers prior to a county issuing permits for some new types of onsite sewage systems;
3) a requirement that a maintenance document be recorded with the deed for onsite sewage systems that require maintenance or monitoring at a frequency interval of 12 months or less;
4) a requirement that building departments refer applicants for building permits to the county for evaluation of existing onsite sewage systems when modifications to a building alter the number of bedrooms or when a commercial building is altered such that its wastewater discharges are affected;
5) reference to additional manuals: recirculating sandfilters, split-bed recirculating sandfilters, and drip irrigation;
6) a statement that counties may make arrangements with the Department for inspection of certain POWTS systems;
7) a statement that if orders are issued, they could include prohibition of an activity or practice;
8) a statement that linear load rates must be considered in an onsite sewage system design;
9) a requirement that older systems must be inspected for ponding at least once every three years.

Changes

1) change in the 18 month delay counties are allowed to an 18 month rolling delay for implementing new types of onsite sewage systems, which means that the 18 months for a given new type of system starts when the system is approved by the Department;
2) a change in the listing of types of onsite sewage component counties may elect to delay to include disinfection units;
3) a change in re-evaluation of a system flow to base it primarily on number of bedrooms for residential systems;

Deletions

1) elimination of the final effluent quality *design* standard of less than 200 CFU, colony forming units per 100 ml. This does not affect the requirement that designers meet the groundwater standards;
2) elimination of the final column in Table 83.44-3 and changes in 83.44(3) & (4) which change the minimum vertical separation to bedrock or high water from 12 inches to 24 inches of unsaturated soil.

Alternatives Considered In the Order of Their Environmental Preference

In initiating this rule development project, the Department first reviewed onsite sewage system rules from other states. Many states have used Wisconsin rules as their model. Other states have rules that are either less technically precise or are considered generally not sufficiently protective of the environment, e.g., one state requires only one foot of soil treatment. Some states have excellent rules, but aspects of these are specific to the geography, climate and soils of that state. In addition, the state of Wisconsin is unique in its groundwater law. Thus, although this review of other state's rules led to a number of concepts which were found useful and were eventually adopted or adapted for the Department's proposed rule, no other state's rules in their entirety were found to be a practical alternative.

For this EIS, the Department considered the proposed rule (A), the no-action alternative (current rule) (B), and the Wisconsin County Code Administrators (WCCA) proposal (C). The Department also considered numerous alternatives for some parts of the proposed rule (D through N). To the best of the Department's understanding, the following alternatives are set out in the order of their environmental preference.

A. Proposed Rule/Selected Alternative

The Department finds that the proposed rule best meets the Department's intent and mandate. Compared to the current rule, which is the no-action alternative, the salient changes in regulation under the proposed rule are:

1) Addition of a protocol for introducing new technology that does not require a revision of the rule to include a prescriptive description of each new technology. The limited types and rigid specifications of POWTS currently allowed leave many unsewered sites that are planned and zoned for residential construction undevelopable, except by use of holding tanks where those are allowed. POWTS technologies exist that can protect public health in a variety of specific site conditions. A wider range of appropriate techology is beneficial for property owners and removes barriers to effective land use planning, zoning, and implementation.

2) Elimination from the plumbing rule of the mandate of connecting to public sewer and/or water. Municipalities and sewer and water districts may require or prohibit such connections under the powers and authority they are given in Chapters 66 and 281.145, Stats. Removal of the statewide requirement from the plumbing rule places the decisionmaking in local hands, as the legislature intended.

3) Removal of the current statewide restriction on holding tanks which limits their use to last resort only. This will have an economic benefit for property owners building limited use structures and may be the best public health solution for these limited use situations. Local governments may still ban holding tanks.

4) Reduction of some setbacks because of safety improvements in technologies such as septic tanks. This will allow smaller lot sizes, thus removing potential barriers to effective land use planning and zoning.

5) Creation of a technical advisory committee to provide public input into product approvals, design packages and experiments.

6) Creation of more stringent maintenance rules and a statewide electronic maintenance tracking system.

7) Creation of a credentialing program for individuals who are to provide required inspection and maintenance services for mechanical POWTS components.

8) Incorporation of groundwater standards of Chapter NR 140, Wis. Adm. Code.

B. Current Rule (No-action Alternative)

If the no-action alternative had been selected, the current rule would continue in effect. The current rule does not satisfy the purpose and need for this project. It has not been fully revised since 1980. It lacks reference to the groundwater standards of Chapter NR 140, Wis. Adm. Code. The current rule limits access to appropriate onsite sewage system technologies, thereby rendering unbuildable some lots that are planned and zoned for residential construction. It discourages the development and implementation of technologies that could provide better protection of groundwater. And the rule's rigidity in the face of a changing technical and socio-economic environment has led to inconsistencies in the ways in which it is applied. The Department has determined that the current rule must be revised.

C. The Wisconsin County Code Administrators (WCCA) proposal.

The Department rejected this alternative as it was proposed because it is incomplete, internally inconsistent and does not satisfy the Department's purpose and needs. It is primarily a mixture of current and proposed rule provisions (see final EIS Sections 5.4.1 and 5.5). Some provisions in the WCCA proposal, such as additional outcome standards and a phase-in of nitrate standards, were considered as individual alternatives (see below).

D. Phase-in compliance with Chapter NR 140 nitrate standard

The Department has chosen to exercise the discretion given it in Section 160.255, Wis. Stats, to except private sewage systems from the nitrate standard. This alternative is rejected as a statewide measure because it would add costs to all systems without evidence of a commensurate benefit. The proposed rule recognizes the right of local governments to require nitrate removal. The Department will review and recognize new technology for nitrate removal as requested. The proposed rule will reference at least one nitrate removing component at promulgation.

E. Maintain minimum 36 inch vertical separation

The Department has determined that this alternative is not needed to protect public health. Some types of POWTS provide consistent and adequate treatment of domestic wastewater with treatment media other than soil. Maintaining a minimum 36 inch vertical soil separation for systems using non-soil treatment media is not necessary to adequately protect public health and the waters of the state.

F. Require evidence that an onsite sewage system is contaminating before issuing orders to replace.

In an earlier draft of the proposed rule, the Department required enforcement agencies to prove that any onsite sewage system was polluting prior to ordering it replaced. The intent of this requirement was to eliminate a potentially unnecessary economic burden on homeowners.

County rule administrators objected to this requirement because it is difficult and expensive to prove that a specific onsite sewage system is discharging contaminants. The proposed rule now creates a rebuttable presumption that pre-1970 systems with less than 24 inches of suitable soil between the infiltrative surface and bedrock or high groundwater are polluting and that those with 24 inches or more of suitable soil are not. Post-1970 systems are required to meet rule standards. The Department finds that this is a reasonable compromise. Research has shown that the probability that a system is contaminating is low with soil depths of at least 24 inches and is higher with soil depths of less than 24 inches.

G. Maintain holding tanks as a system of last resort.

The Department does not consider it appropriate for the State to deny homeowners, on a statewide basis, the use of a technology, such as a holding tank, that may be the most effective solution in specific situations. If holding tanks could only be used as systems of last resort, unreasonable and irrational situations could arise. For example, a person could be required to install an expensive mound system for a vacation home with intermittent and limited use. In this case, a holding tank may be a better choice environmentally as well as economically because a mound system requires relatively consistent flows to develop the clogging mat that allows it to function most effectively.

Under the proposed rule, local governments would still have the authority to ban or limit holding tanks by ordinance.

H. Allow ground surface dispersal of final effluent.

Based on comments received, and a lack of demand for systems that disperse to the surface, the Department decided not to pursue this alternative.

I. Increase delay period to 36 months.

The Department initially proposed to allow counties to impose an 18 month delay before approving some new types of technologies. The intent was to allow time for local governments to revise their ordinances and to get their staff trained on new systems. The Department was asked to consider allowing counties to impose a 36 month delay. The Department has revised the proposed rule to allow counties to impose an 18 month delay *from time of Department approval* on types of technologies approved in the future which require training and which are not now listed in the proposed rule. With this revision, the Department has determined that the delay period in the proposed rule is sufficient.

J. Allow local authorities to ban or limit any type of system.

This alternative was suggested, but the Department has rejected it because the alternative is not consistent with the intent of the proposed action – which is to provide appropriate types of onsite sewage system technology for any site approved for construction. In addition, this alternative could be used by counties to reverse land use decisions currently made at the municipality level. For instance, the county could ban all systems, including conventional systems. This would transfer effective zoning power from

municipalities to counties because they could reverse zoning decisions by blocking construction on a lot the municipality had zoned residential. This is a land use decision, not a public health decision. The Department does not consider onsite sewage system regulations as appropriate land use tools.

The proposed rule does allow counties to ban or limit certain onsite sewage system technologies such as holding tanks, evapotranspiration systems and constructed wetlands.

K. Require field trials in Wisconsin for new design packages

The Department rejected this alternative because the political boundaries within which experiments are carried out to get performance data are irrelevant. The pertinent factors are site and climate conditions that are similar to Wisconsin's. The Department sees no reason to require redundant research within Wisconsin if adequate research under conditions similar to those in Wisconsin has been completed.

L. Require design packages to undergo WEPA review

The Department does not believe it is reasonable to require each design package to undergo WEPA review. Design packages must demonstrate that they meet the standards set in the proposed rule. These standards have been subjected to WEPA review. In addition, the proposed rule provides for public input on the recognition of new types of onsite sewage systems through an Advisory Council.

Like all other agency actions in the state of Wisconsin, if Department approval of a new technology is a major action that could significantly affect the quality of the environment in ways not already disclosed in this final EIS, an EIS will be required.

M. Continue mandatory municipal ownership of cluster systems

The Department has determined that this alternative would unnecessarily limit options for management and ownership of cluster systems notwithstanding a lack of evidence that private ownership would result in adverse environmental impacts. The proposed rule does allow counties to limit forms of ownership of cluster systems.

N. Require final effluent standards for other substances

The Department has determined that final effluent quality standards are not needed. They are not required by the groundwater protection law. The proposed rule requires compliance with Chapter NR 140, Wis. Adm. Code, standards, with the exception of nitrate, which was excepted in Section 160.255, Wis. Stats., and with the exception of the preventive action limit (PAL) for chloride, which is not required.

The Department recognizes that there are some pathogens, such as viruses, which may not be adequately represented by current indicators. The Department will continue to review new research designed to develop better indicators, and will adopt new indicators when it determines that these are effective and reasonable.

Discussion of Impacts

1) Impacts on public health

The Department has determined that properly functioning onsite sewage systems have no significant adverse impacts on public health. A letter from the State's Bureau of Public Health states that there is no empirical evidence statewide to justify a recall of existing systems which have less than 36 inches of soil between the infiltrative surface and bedrock or high groundwater (Attachment C). Therefore, there is no empirical evidence statewide that systems with 36 inches of soil and those designed to equal the performance of systems with 36 inches of soil are negatively affecting public health (final EIS pp. 187-88, 68. Also relevant is the discussion on domestic wastewater constituents, pp. 71-84).

There are potential impacts of *failing* systems on public health if effluent from these systems reaches groundwater or surface water or land surface and if that effluent contains pathogenic constituents. This potential impact exists under all alternatives. However, the proposed rule requires better measures for inspection and maintenance, and the establishment of a computerized system for tracking POWTS maintenance, which may provide an improvement over the current rule in identification and correction of failing systems.

All types of sewage systems, onsite and municipal, have a risk of failure. Soil-based treatment systems are more vulnerable to weather events, such as excessive rainfall, and to human error in construction. Non soil-based treatment systems are more vulnerable to improper maintenance, but are also easier to identify if they are failing. Both soil-based and non soil-based systems are vulnerable to human errors such as dumping of toxic wastes; and both are vulnerable to household variability in amount and quality of discharges of domestic wastewater into the system.

2) Impacts on groundwater

There are no significant differences between the proposed rule and other alternatives (with the possible exception of alternative D, the nitrate phase-in) in regard to groundwater impacts. New technologies will only be permitted if they are at least as effective in protecting groundwater as are currently recognized technologies. In fact, there is a potential for increased protection of groundwater under the proposed rule if the design standards lead to the introduction of new systems that are better than current systems, or if maintenance tracking identifies and helps in correcting failing systems. These benefits will be realized dependent upon the behavior of the industry and regulators after the rule is in effect.

None of the alternatives considered can ensure that there will never be an incidental exceedence of groundwater standards in Chapter NR 140, Wis. Adm. Code. There are data that indicate that systems designed and maintained in accordance with the proposed rule will meet the groundwater standards at a well, a point of standards application (POSA), although the final EIS acknowledges that exceptions may occur. The available data indicate that groundwater standards will typically be met at lot lines, also a POSA, which could be within five feet of a drainfield. There are no data indicating that an incidental exceedence at a *lot line* will have an adverse impact on either public health or the waters of the state. Nor is there any evidence that any of the considered alternatives will differ in this regard.

3) Impacts on local governments

The proposed rule will place some increased burden on local governments due to the training required to inspect new technologies. Local governments will not conduct plan reviews on the new types of technologies, and they can choose not to be involved in the monitoring of maintenance. But local

inspectors will continue to inspect new installations and enforce standards. Under the proposed rule, local inspectors must acquire and maintain the necessary skills to regulate the new technologies.

The Department does not expect this burden to be excessive. Technologies other than those currently permitted for general, replacement or experimental use are expected to be a very small proportion of systems installed each year. Trends detailed in the final EIS indicate that most people will continue to use the currently approved technologies to the extent possible. Despite 20 years of availability of mounds, for example, they still comprise only approximately 20 percent of total new systems annually.

The Department, the University of Wisconsin-Madison and the industry offer training opportunities at various locations in the state. The technologies that will be recognized at the time the proposed rule is promulgated are already in use in the state in experimental installations or for replacement installations. Hundreds of regulators across the state have attended courses offered over the past three years that cover these new technologies. Because POWTS professionals have continuing education requirements under the current rule in order to remain credentialed, the burden of additional training under the proposed rule is not expected to be significantly different than the burden of maintaining credentials under the existing rule. The proposed rule will allow local governments to delay implementation of technologies approved after the rule is promulgated for 18 months from the time they are approved to allow POWTS professionals time for training. The proposed rule will also require installers to be trained and counties will be allowed to refuse to issue permits for some types of components if the local personnel are not trained. These measures are expected to mitigate the burden of new technologies on local government.

The Department recognizes, however, that the workload for local governments will continue to increase because of the steadily increasing inventory of systems in the state. This is due to the state's population increases and level of economic development. The alternatives do not differ in this regard.

4) Impacts on land use

The proposed rule will decrease inequities faced by individual property owners who are not currently allowed to use appropriate technology on their lots notwithstanding that these lots may already be zoned for residential construction. The statewide rate of development outside of sewered areas is expected to be the same under all alternatives. The proposed rule may *shift* some construction to individual lots that are restricted under the no-action alternative rather than requiring those people to find other lots. This could have either adverse or beneficial impacts on land use, depending on location and circumstances.

Critics have argued that if there is more land for development, there will be more land developed. But to support that hypothesis, it would be necessary to show that the current rule limits the rate of development. The evidence presented in the final EIS does not support that hypothesis. That evidence includes:

1) **Supply** There are approximately 20 million acres in the state where soils of at least 24 inches depth predominate, that is, soils available under the no-action alternative (final EIS p. 57). These soils are dispersed throughout the state. With that amount of supply, a homeowner could find a site somewhere in most unsewered areas.

2) **Distribution** As stated in the final EIS, the data definition supplied by the Natural Resource Conservation Service suggests that the additional land that will be available under the proposed rule is distributed in pockets throughout the state. Data on sanitary permits collected and analyzed in the final EIS provided evidence of what this means for system installations. Section 4.9 of the final EIS shows areas that will have the most change in supply under the proposed rule. The final EIS demonstrates, however, that even in these areas, the data on new sanitary permits shows that sites are being regularly developed.

3) **Technological change** A past change in POWTS technology (mound systems) which resulted in an increase in available sites did not result in higher levels of development statewide (final EIS pp. 36, 41). Mounds were introduced about 1980, so one would expect there to be an increase in total systems permitted in the following years if increases are due to changes in POWTS technology. There was actually a precipitous drop, demonstrating that economic and other factors drive and limit development rather than POWTS regulations.

4) **Numbers of permits** If the availability of suitable building sites under the current rule is limiting development, there should be a steady reduction in sanitary permits for new systems despite the continuing strength of the economy. The number of sanitary permits for new systems under the current rule, however, has increased or been steady for the ten years up to and including 1996 (final EIS p. 41).

5) **Type of technology** If the supply of sites with 36 inches of soil between the infiltrative surface and bedrock or high groundwater were insufficient to accommodate existing development, there should be a more marked shift to mound systems. After 20 years, mound systems still are only approximately 20 percent of total new systems. Conventional and at-grade systems still are approximately 65 percent of new systems.

All of this evidence indicates that the statewide demand for sites is being met under the current rule. As noted above, there are individual problems or inequities in that some people cannot use a particular site that they want to use. The final EIS discloses that the proposed rule may allow development on *some sites* where it could not occur under the current rule (final EIS pp. 171, 183, 185). But this does not mean that there will be a statewide increase in the number of sites developed.

The question of whether a specific site is, or is not, the better site for construction from an environmental perspective cannot be determined by soil depth. There are significant adverse environmental impacts from construction in unsewered areas (and can be in sewered areas as well), which the final EIS discloses, but the Department finds no compelling evidence that the alternatives differ in this regard.

The Department also notes that the analysis of this EIS in regard to land use is in substantial agreement with the analysis of the Final Environmental Impact Statement for Three Alternative Systems (Mounds) for On-site Individual Wastewater Disposal in Wisconsin which was done by the Department of Health and Social Services in 1979.

Under any alternative, local municipalities may determine under their zoning powers where and when development may occur.

MEASURES TO MITIGATE ADVERSE IMPACTS

All practicable means to avoid or minimize environmental harm have been adopted. These include:

- The proposed rule specifically acknowledges local government authority to require nitrate removal through their zoning ordinances. Under the proposed rule, the Department will review and approve nitrate removing treatment units through its product approval process.
- The Department has increased its training activities and its use of the monthly newsletter, the *Wisconsin Plumbing Codes Report*, to disseminate information on new technologies.
- The proposed rule gives local governments 18 months from the time of approval of a new technology that requires training until they must implement it.
- If requested, the Department will inspect new technologies to ensure they are installed correctly.

Dated this 6th day of July, 1999

STATE OF WISCONSIN
Department of Commerce

Brenda J. Blanchard
SECRETARY