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Attachment A

Summary of FEIS Comments with Department of Commerce Responses

Date received	Name of Submitter	Comment	Response
September 29, 1998	Harold R. DeBack	1. "The comments by the DNR have all been satisfactorily responded to the Department." 2. Other comments did not address the EIS.	1. No response required. 2. No response required.
September 29, 1998	Niki McGlathery	Comment did not address EIS.	No response required.
October 5, 1998	Darryll Farmer, Director of Environmental Health, Eau Claire County Health Department	1. FEIS does not adequately address the negative impact of allowing holding tanks. 2. FEIS does not adequately address human health risks of adopting a 200 fecal coliform per 100 ml final effluent standard. 3. FEIS has over-simplified the significance of the potential problems created by the more complicated types of POWTS that could be installed under the proposed rule.	1. FEIS acknowledges both positive and negative aspects of holding tanks. Proposed rules should reduce use of holding tanks by allowing other technologies for new construction on sites currently suitable only for holding tanks. 2. The proposed 200 fecal coliform standard applies only to final effluent quality at the end of the treatment component. This is no different than the performance of current systems for which there is no evidence of adverse health impacts (pp. 187 and 164, FEIS). The proposed standard does not supercede the statutory groundwater protection standards and the ch. NR 140 enforcement standards at points of standards application. 3. There is no evidence that systems recognized under the proposed code have any greater potential for problems than systems installed under the current rules. Risk

Date received	Name of Submitter	Comment	Response
			factors and potential impacts associated with all types of systems are discussed in FEIS (pp. 71-74, 194-198, and Appendix B, pp. 22-36).
	Karolyn Beebe	Comment did not address EIS.	No response required.
October 8, 1998	James Clark, Past President and Sanitation Committee Chair, Wisconsin County Code Administrators	1. FEIS fails to accurately describe changes in administrative guidance under proposed rules. 2. FEIS fails to adequately address alternatives to the proposed action. 3. FEIS Appendix B and the expanded sections in the FEIS do not provide an adequate evaluation of risk. 4. WCCA is skeptical about FEIS claims that the Department has an established maintenance monitoring protocol ready for immediate implementation.	1. Appendix H in FEIS accurately compares current and proposed administrative guidance. WCCA claims that eight current code sections are not addressed by the proposed code; however they fail to identify those not addressed by the FEIS. 2. The Department addressed all reasonable and practical alternatives. 3. The Department believes risk is adequately discussed on pp. 71-74, 194-198, and Appendix B, pp. 22-36. 4. The Department will demonstrate the maintenance tracking system to interested parties upon request.
October 9, 1998	Brian Burke, Wisconsin State Senator	1. FEIS does not discuss in detail potential ways to create a bias toward simpler onsite systems that are more robust and have a greater margin of protection.	1. The Department is not aware of any such alternatives. No such alternatives were suggested to the Department during the EIS scoping

Date received	Name of Submitter	Comment	Response
			period or during the public comment periods on the two previous Draft Environmental Impact Statements.
		2. FEIS too casually dismisses the concept of subdivision plat approval and does not discuss ways to influence the decisions made in the earliest stages of property development that affect subsequent decisions regarding onsite systems.	2. The Department's current review of plats provides little, if any, added value in the process. If systems are available for most site conditions, it is unclear what influence the Department should have.
		3. FEIS includes only a cursory discussion of monitoring and in effect "gives up" on the idea of monitoring on the grounds that it is "difficult to detect the attainment or exceedence of [groundwater] standards." The FEIS should consider other monitoring alternatives as a means of providing feedback to the Department regarding its own decisions, and the decisions of county staff, in approving onsite systems.	3. FEIS recognizes that groundwater sampling at points other than existing wells is not feasible on a statewide basis. No such monitoring alternatives were suggested to the Department during the EIS scoping period or during the public comment periods on the two previous Draft Environmental Impact Statements.
		4. FEIS needs to consider other alternatives related to management of onsite systems.	4. Department is not aware of any such alternatives and no such alternatives were suggested to the Department during the EIS scoping period or during the public comment periods on the two previous Draft Environmental Impact Statements.
		5. Believes that the FEIS implies that s. 160.255, Stats., leaves the Department	5. The FEIS recognizes that the statutes give the Department

Date received	Name of Submitter	Comment	Response
		with no choice other than to except onsite systems from a nitrate standard. 6. FEIS should consider alternatives that fix the responsibility for failures on those who make the key decisions regarding onsite system installation. 7. FEIS should discuss alternatives for providing information regarding the onsite systems on a property to the property owners.	discretion and that the Department is exercising that discretion. 6. No such alternatives were suggested to the Department during the EIS scoping period or during the public comment periods on the two previous Draft Environmental Impact Statements. 7. The proposed code will include a requirement for recording this information with the deed to the property.
October 9, 1998	Dave Mundigler, Racine County Code Administration Manager	1. Concerns from DEIS comments are still valid. Responses to his DEIS comments in Appendix H do not address full content of his letter. 2. Page 63 of FEIS misstates Racine County policy on holding tanks. 3. Disagrees with generalization that unsuitable mapping units will generally contain some area of suitable soils. 4. FEIS does not adequately consider the additional land that will be available for construction with the proposed code.	1. Department has responded to these concerns in Appendix H of FEIS. Letter included comments related to the code that were not germane to the DEIS. 2. Corrected in errata sheet accompanying Record of Decision. 3. Mapping units contain multiple soil types. They are not mutually exclusive. The Department maintains this generalization. 4. The FEIS provides extensive consideration of the potential acreage that would become suitable for a new soil absorption system and discusses the factors that determine whether or not those lands could be available for construction.

Date received	Name of Submitter	Comment	Response
		5. Believes that the groundwater protection standards will be rendered "quite meaningless" because FEIS states that it will be difficult to detect the attainment or exceedence of these standards at a point of standards application and that establishing monitoring or sampling programs would be prohibitively costly.	5. The groundwater protection standards apply to all POWTS under the current code as well as any future code. The proposed code does not affect the groundwater protection standards. The fact that it is difficult and costly to ascertain compliance at the lot line, for example, is not the result of the private sewage code. Moreover, approved POWTS technologies will have to be demonstrated to comply with the final effluent quality standards before approval.
		6. Asks that the Department consider the WCCA FEIS comments.	6. These comments have been considered.
October 9, 1998	David A. Holman, Director of Zoning and Sanitation and Environmental Health Director, Rock County	1. FEIS does not indicate how public health and the environment will be protected [under the proposed code] in a more cost effective manner than the existing code.	1. FEIS does not address cost effectiveness of alternatives except for those subalternatives that would not be economically feasible. Maximizing cost effectiveness is not a necessary requirement for the proposed code. The choice of type of system, and the accompanying cost-effectiveness, is up to the consumer.
		2. FEIS does not adequately address the cost/benefit of present or proposed onsite sewage systems.	2. The Department will not specifically evaluate proposed systems on a cost/benefit basis, since no specific systems will be mandated by the Department. Builders and homeowners will

Date received	Name of Submitter	Comment	Response
			make decisions on the type of system appropriate for their specific situation based on cost and other factors. The Department will not restrict the use of system types on a cost-basis, but rather allow consumers greater freedom of choice.
October 9, 1998	Gail E. Sumi, Intergovernmental Coordinator, Wisconsin Alliance of Cities	1. FEIS does not adequately address alternatives to the proposed action. 2. FEIS does not fully examine "alternative systems" as they relate to ch. 160, Stats. 3. FEIS does not effectively review the potential environmental impact when a local government does not have the fiscal resources to give proper oversight or have a maintenance tracking system. 4. FEIS does not comply with the spirit of, if not the letter of, WEPA and	1. The Department considered all reasonable and practical alternatives proposed. 2. Available data relating to compliance with NR 140 standards at points of standards application are discussed; however, no research has specifically addressed this question. The Department's current experimental policy stresses this question as an area of emphasis. 3. The Department will not allow systems with new potential environmental impacts to be used in counties where personnel have not been trained in the management and inspection requirements of those systems. Local governments will not be responsible for individual maintenance tracking systems. The Department will maintain a statewide tracking system. 4. The Department believes that it does.

Date received	Name of Submitter	Comment	Response
		Wisconsin's groundwater statutes.	
October 9, 1998	Gloria B. Berman	Comment did not address EIS.	No response required.
October 9, 1998	Laura J. Leitsch, Whyte Hirschboeck Dudek, S.C., representing the Wisconsin Association of Local Health Departments and Boards	Comment did not address EIS.	No response required.
October 9, 1998	Marian Possin, Green Lake Preservation Society Chairperson	1. Does not feel that the proposed rule changes would improve groundwater protection. 2. Disagrees with FEIS argument that holding tanks may be appropriate for seasonal use. Argues that seasonal properties may become year-round homes. 3. Believes that FEIS statement regarding the fact that counties have been aware of the proposed rules for several years is highly presumptuous. 4. FEIS acknowledges impacts on sensitive areas. 5. Other comments did not address EIS.	1. FEIS does not claim that groundwater protection will necessarily be improved, but that it will be at least equal to that provided under the current code. 2. Department maintains assertion that holding tanks can be preferable for seasonal residences. Proposed rules would allow soil absorption replacement system for dwellings that change use if appropriate. 3. No response required. 4. No response required. 5. No response required.

Attachment B

Letter: Bureau of Public Health

Tommy G. Thompson
Governor

Joe Leean
Secretary

State of Wisconsin
Department of Health and Social Service

DIVISION OF HEALTH

BUREAU OF PUBLIC HEALTH
1414 E. WASHINGTON AVE., ROOM 167
MADISON WI 53703-3044

(608) 266-1251

May 19, 1997

Michael Corry
Safety and Buildings Division
Department of Commerce
201 East Washington Avenue
P.O. Box 7969
Madison, WI 53707

Retroactive Application of Private Septic System Code Revisions

Dear Mr. Corry:

In your May 13th letter to Mr. Warzecha, you asked if there were data available that links older septic systems to health problems in the state. Specifically, you are interested in those not having the minimum three-foot of soil above a limiting condition (either bedrock or high groundwater). No health studies have been conducted on that topic. The replacement cost for the number of potentially effected systems that you have outlined is very high. I agree that we should have significant tangible evidence of the health benefit prior to considering a general recall of the systems lacking three feet of soil. There is no empirical evidence statewide to currently justify such a recall.

There are some difficulties related to conducting health studies on this issue. The types of health effects generally thought to be associated with exposure to non-treated wastes from a failing septic system (diarrhea and flu like symptoms) are not uniformly reported to physicians, and if reported to physicians, they are not necessarily reported to public health officials. When these health effects are reported there is no automatic mechanism for follow up to identify an environmental cause. The study that your agency is currently sponsoring with the Marshfield Clinic will be of great interest for these reasons.

Failing septic system are public health hazards. The ability of your inspectors and your agents to take actions based on potential public health hazards should be maintained. Your agency's administration of the Wisconsin Fund serves a very important public health function by helping homeowners abate health hazards. The system replacement costs could be prohibitive without assistance, especially for low-income families. This fund could not support the estimated cost of replacing eligible systems potentially effected by this requirement.

In your letter you mentioned the option of developing a local solution if specific local conditions are better indicators of increased health problems. Because of the extreme variation in relevant geologic and demographic conditions across Wisconsin, such an approach may be appropriate. Local health departments may have records of anecdotal incidents of health effects related to failing septic systems. If you feel it would be appropriate, the Bureau of Public Health could help your agency gather that type of health information from local health departments. We would ultimately defer to the local health department representatives from the ILHR 83 external advisory committee on the local health issues.

I appreciate your interest in receiving continued input from our agency and the local health departments while developing this important administrative code. If there is additional information that I, or others in our agency could provide, please contact me at 264-9880.

Sincerely,

Tom Sieger
Environmental Epidemiology and Prevention Section Chief

cc: Bill Otto
Chuck Warzecha
Ken Baldwin/Meg Ziarnik
John Chapin

Attachment C

Public Hearing Attendance Record
September 28, 1998

DEPARTMENT OF COMMERCE
PUBLIC HEARING ATTENDANCE RECORD

RELATING TO: Final Environmental Impact Statement (FEIS)
RULE NO.: Proposed Chapter Comm 83
LOCATION: 201 W. Washington Ave., 1st Floor Conference Room

DATE: Monday, September 28, 1998
TIME: 8:00 a.m. – 5:00 p.m.
CITY: Madison, Wisconsin

Name	Representation (Business, Assoc., Group, Self, etc.)	City and State
PAUL J CHICKERING	WAUKESHA FREEMAN / OCONOMOWOC ENTERPRISE	OCONOMOWOC, WI
BOB BOWMAN	DANE CO. TOWNS ASSOC. / SELF	CROSS PLAINS, WI
BILL LANE	DANE COUNTY REGIONAL PLANNING COMMISSION	MADISON, WI
Rick Verstegen	Dept. of Commerce	Madison, WI
Ed Huck	WI Alliance of Cities	Madison, WI
Jim Clark	WIS. County Coord Assoc.	WAUNAKEE WI
DAVID Holman	Rock Co. E.H. Division	Janesville WI

WISCONSIN ALLIANCE OF CITIES

14 W. MIFFLIN • P.O. BOX 336 • MADISON, WI 53703-0336 • (608) 257-5881 • FAX 257-5882

Post-it® Fax Note 7671	Date 8/13/99 # of pages ▶ 7
To Steve	From Rich E.
Co./Dept.	Co.
Phone #	Phone #
Fax #	Fax #

Date: August 13, 1999

To: The Media

From: Ed Huck & Rich Eggleston (608-257-5881)

Re: Comm 83 hearings, drinking water and public health concerns

We received a memo yesterday, indicating that a Department of Commerce rule now undergoing legislative review would:

- **violate the federal Safe Drinking Water Law;**
- **lack protection of ground water in areas that rely on wells; and**
- **impose new costs on communities that rely on wells for their public water supply.**

The rule, Comm 83, would do so by authorizing the widespread use of high-tech septic-tank alternatives that endanger the ground water on which three-fourths of Wisconsin residents rely for drinking and bathing.

"It is undisputed by the Department of Commerce that these (Comm 83-authorized) systems will not meet safe drinking water standards," Lawrie Kobza of the Boardman, Suhr, Curry & Field law firm wrote.

Two drinking water quality standards would be tossed out the window if the Legislature allows the rule to take effect, Ms. Kobza wrote: nitrates and total coliform, an early warning of bacteria that can endanger health.

Legislative committees have scheduled two hearings to review Comm 83. They are:

Assembly Natural Resources Committee
10 a.m. Wednesday, Aug. 18
Room 328 North (location tentative)
Capitol

Senate Environmental Resources et al
10 a.m. Thursday, Aug. 26
Room 411 South
Capitol

We intend to testify on some of the more technical aspects of the rule, and we hope local officials concerned with the rule's direct and indirect effects also will appear against the rule.

If you have any questions, or desire a copy of the three-page memo, please call. ■

BSC&F
Boardman, Suhr, Curry & Field LLP
ATTORNEYS AT LAW

Fourth Floor
One South Pinckney Street
P.O. Box 927
Madison, WI 53701-0927

Telephone (608) 257-9521
Facsimile (608) 283-1709

LAWRIE J. KOBZA
Direct Dial Number (608) 283-1788
E-mail: lkobza@bscf.com

August 12, 1999

VIA FACSIMILE 257-5882

Mr. Edward J. Huck
Executive Director
Wisconsin Alliance of Cities
14 West Mifflin, Suite 106
P.O. Box 336
Madison, WI 53703-0336

RE: Comm 83 and Drinking Water Concerns

Dear Ed:

This letter is to follow up our discussion about Comm 83 and the consequences it would have on Wisconsin's drinking water. Some of the problems that I see with Comm 83 as it affects drinking water are as follows:

- Comm 83 violates the federal Safe Drinking Water Act by allowing the injection of waste into the subsurface at levels which exceed safe drinking water standards;
- Comm 83 allows the installation of private wastewater systems without adequate controls and protections in areas which provide the source of drinking water;
- Comm 83 will increase the cost of testing, operating, and possibly treating and replacing, existing drinking water wells for all public wells owners. Public well owners include resorts, restaurants and taverns, churches, schools, factories, industrial parks, communities and others. As an aside, Wisconsin has the largest numbers of public groundwater wells in the United States.

It is my opinion that Comm 83 violates the federal Safe Drinking Water Act which prohibits the underground injection of waste which endangers drinking water sources. A septic system larger

BSC&F Boardman, Suhr, Curry & Field LLP

than an individual septic system is considered by federal regulation to be an underground injection well which is allowed only if it can be shown that the system will not result in drinking water sources being contaminated with contaminants in excess of safe drinking water standards.

It is undisputed by the Department of Commerce that these systems will not meet safe drinking water standards. Comm 83 itself provides that these systems are not required to meet the nitrate groundwater standard (which is the same as the safe drinking water standard). Furthermore, and perhaps even more significantly, the EIS recognizes that these systems will likely not meet the safe drinking water standard for total coliform – an indicator of bacteria which can pose a major health concern.

The discharge of contaminants into the groundwater at levels which exceed drinking water standards endangers drinking water sources. It seems particularly ironic that on one hand we build wastewater treatment plants and require extensive monitoring of discharges into surface waters in order to ensure that surface water resources are clean, but on the other hand Commerce wants to allow discharges of contaminants into drinking water sources at levels which EPA says are not safe.

It is also ironic that in other areas, Wisconsin is taking steps to protect the source of drinking water. For example, Wisconsin is developing a source water protection program which will identify drinking water well protection areas and contaminant sources within those areas in an effort to take protective measures to ensure that drinking water does not become contaminated from these sources. But with Comm 83, the State would be permitting more potential contaminant sources to groundwater, and these sources would be permitted without even requiring that periodic monitoring be conducted to ensure that groundwater is not being contaminated.

What Comm 83 essentially does is to alleviate the costs and burdens of installing and operating a private wastewater system, by moving those costs and burdens to the groundwater (the drinking water supply) and the owners of public drinking water wells. While it becomes easier to install a new private wastewater system, it becomes more expensive and riskier for existing owners (and new owners) of drinking water wells to maintain those wells.

Owners of public drinking water wells (which, as mentioned above, includes resorts, restaurants, churches, schools, factories, industrial parks, communities and others) are required to test their water to ensure that it meets safe drinking water standards. If it does not, the water must be treated or a new water source must be found. Under new rules which will be proposed shortly, still more testing will be required for total coliform and fecal coliform, especially in areas of fractured bedrock and gravel aquifers. If fecal coliform is detected in any one water sample, the

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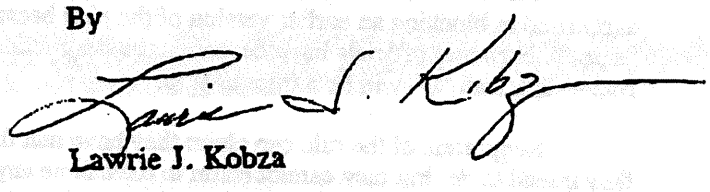
owner of the well must treat or provide an alternative source of water (a new well) no later than six months after the contamination is detected. EPA indicates that this action is triggered after only one sample because a fecal positive sample indicates a serious contamination problem.

If this situation occurs, the well owner will be required to remedy a problem caused by the wastewater system owner. The private wastewater system owner will have been able to discharge its waste into and contaminate the groundwater for its own benefit without cost, while the well owner who seeks to use groundwater for drinking will be required to pay for cleaning up the contamination caused by the wastewater system owner.

Overall, it appears to me that Comm 83 could result in the contamination of drinking water resources just to ease the burdens on new private wastewater system owners.

Let me know your ideas on this. We will talk soon.

BOARDMAN, SUHR, CURRY & FIELD LLP
By



Lawrie J. Kobza

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"In My Opinion"
Private Sewerage Rule Dumps on Wise Land Use

By Edward J. Huck

The state Department of Commerce holds a public hearing Monday on a document that has vastly more to do with the environment in which we will live and raise our children and grandchildren than all the documents that have gotten so much media attention in Washington lately.

This state document is the final environmental impact statement on a rule that officials acknowledge could affect the development of up to 8.9 million acres of Wisconsin — one quarter of the state's entire area.

The proposed rule could allow bulldozers entre onto more than 100,000 acres of Door County's fragile ecosystem and speed the suburbanization of Racine and Waukesha counties. It could diminish the forests and wetlands of Clark County and gobble up farmland in Outagamie County. It could impose new workload requirements on already overburdened local governments. All this is according to the dispassionate language of the environmental impact statement itself, not the frenzied arguments of partisans.

What could the state do to unleash so much harm? Devise a land use plan run amok? No, the proposed rule simply is trying to pave the way for use of new human waste disposal technologies in areas where old-fashioned septic tanks don't work. Unfortunately, the use of this new technology could be dropped on the citizens of Wisconsin before local governments have in place the land use policies that are crucial to reduce the consequences.

The Wisconsin Alliance of Cities and other opponents of Comm 83, as the rule has become known, succeeded in blocking an earlier version of the plan because it did not adequately evaluate environmental impacts. Now that officials have described the destruction of large parts of Wisconsin as we know it, the rule — ironically — will be harder to stop.

Supporters of the rule can claim they have met the legal requirement that they assess the damage they intend to do, but they cannot claim to have done anything to mitigate that damage. State and local governments have made little progress in forging the land use policies that could do so. As long as Wisconsin makes do with more than 1,800 separate land use policies — one for every municipality — and little or no coordination among them, our collective ability to grasp at a land ethic will be tenuous at best. Urban areas will often be unable to grow rationally. Farmers will be driven off their land. Little boxes full of ticky-tacky will proliferate. This is what happens when we have no clear definition of what is "urban" and what is "rural," much less a concept of what those words should mean in the future.

The Wisconsin Land Council, a top-level task force charged with making progress on the land-use front, only in the past week began to craft a strategic vision. The council may not have come on the scene in time to save us from Comm 83.

In the absence of comprehensive land-use policies and a statewide monitoring system to ensure that new private sewerage technologies work as advertised, Comm 83 is a disaster waiting to happen. One only needs to read the environmental impact statement to find out how, and why.

###

1000 FRIENDS OF WISCONSIN

16 North Carroll Street, Suite 810
Madison, WI 53703
Phone: (608) 259-1000
Fax: (608) 259-1621
e-mail:
friends@1000friendsofwisconsin.com

For immediate release
Contact Andrea Dearlove (259-1000)

Septic Rule to Hit Unprepared Towns Hardest

According to a Wisconsin land use policy organization, almost 80% of the towns that would be most heavily impacted by growth pressures from new septic system rules proposed by the State of Wisconsin have no land use plans. More than one out of three has no zoning.

"Local governments are unprepared for the development pressures that this rule change will create," said Dave Cieslewicz, Executive Director of 1000 Friends of Wisconsin. The rule, known as "Comm 83" for its chapter in the state Department of Commerce's administrative code, would allow new septic system technologies which would essentially wipe out any natural limitations on development in the country side according to Cieslewicz.

"Under current rules there are some places that you just cannot build, usually due to thin soils and steep slopes," Cieslewicz said. "That was nature's way of pointing out our limits, but this rule change would essentially allow houses to fill the countryside. At the very least, we should give local governments the tools they need to plan for this development."

The department in their environmental impact statement has said that the rule would open 9 million acres or 25% of the Wisconsin landscape to increased development pressure. An analysis by 1000 Friends using the EIS and data collected by the University of Wisconsin shows that only 22% of the 800 towns most heavily impacted by the rule have any land use plan at all. Moreover, many of these may be outdated, incomplete or otherwise inadequate to deal with the new development pressure.

In addition, 1000 Friends found that 34% of these towns lacked any zoning laws to govern where buildings might be built.

Public hearings on the rule will be held in the Assembly Natural Resources Committee on August 18th and in the Senate Environmental Resources Committee on August 26th. Cieslewicz said that 1000 Friends will ask that the rules be delayed until comprehensive planning legislation is approved, perhaps as early as next month. 1000 Friends has proposed a "Smart Growth" initiative which was adopted by the Joint Finance Committee and the state Senate, but not the Assembly. Cieslewicz said he hoped that the conference committee on the budget would adopt the Senate position. The Smart Growth proposal would

provide a 75% state cost match for preparation of local land use plans and it would provide a common definition of the elements of a "comprehensive plan", something that is missing from current law.

Area	Percent of Towns With Plans	Percent of Towns With Zoning
Clark County Area	15%	43%
Door County Area	21%	57%
Far Northeast Area	7%	63%
Northern Driftless Area	8%	71%
Outagamie County Area	18%	96%
Pecatonica Basin Area	42%	73%
Southern Driftless Area	38%	59%
TOTAL	22%	66%

The seven most impacted areas were identified by the Department of Commerce in their Environmental Impact Statement. The percentages of towns with planning and zoning were derived from "An Inventory of Land Use Plans in Wisconsin" by Brian Ohm and Erich Schmidke, 1998.

Wisconsin
Department of Commerce

P. O. Box 7970
Madison, Wisconsin 53707
(608) 266-1018

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

February 17, 1999

To the Honorable Judy Robson
State Senator
15-S, State Capitol
Madison, WI 53702

Dear Senator Robson:

The Department of Commerce will be offering a briefing for legislators and staff on COMM 83, Wisconsin Administrative Code, on Thursday, February 25, 1999, beginning at 1:00 p.m. in Room 417 North (the G.A.R. Room), State Capitol. We are conducting the briefing, in addition to the joint hearing scheduled by the Senate Agriculture, Environmental Resources and Campaign Finance Reform Committee and the Assembly Natural Resources Committee in the morning of February 25, 1999.

COMM 83, which is also known as the Private Onsite Wastewater Treatment System or POWTS Code, has been the subject of much interest and discussion over the past five years. We have held three sets of public hearings on this code draft since 1995. We have also made revisions to the code draft based on comments received during the hearing process and numerous meetings with other interested and affected parties.

This briefing will offer those in attendance an opportunity to hear presentations that include a general overview of land use issues, how private sewage systems work, and how the code strengthens performance requirements while offering property owners additional options for treatment and dispersal of their wastewater. There will also be an overview of the general code provisions and the changes that have been made to them.

We look forward to discussing the issues with you. If you have any questions regarding this briefing, please call Mike Corry, Administrator, Division of Safety and Buildings at 608/266-1816 or Roman Kaminski, POWTS Program Manager, at 715/345-5334.

Sincerely,

Brenda J. Blanchard
Secretary

150th Year — No. 227 © 1999 Wisc

WISCONSIN STATE JOURNAL

SUNDAY, AUGUST 15, 1999 MADISON, WISCONSIN

re: Comm 83

Huge areas could open to builder

■ New septic technology and change in the plumbing code could make 9 million acres — a fourth of the state — eligible for development.

By Marv Balousek
County reporter

A controversial, proposed change in Wisconsin's plumbing code would open up to development nearly 9 million acres, or an area equal to one-quarter of the state.

Supporters say the change would allow rural homeowners to use new septic system technology and preserve farmland.

Opponents say it could pollute drinking water and promote development in natural areas such as western Dane County, Sauk County's Baraboo Hills and the Door County peninsula.

The Department of Commerce rule change, known as Comm 83, would legalize septic systems that provide above-ground treatment.

That means homes could be built on steep, rocky hillsides and on land near lakes or wetlands with high water tables.

"This will allow the most horrendous proposal when it comes to land use and environmental impact ever to become law," said Ed Huck of the Wisconsin Alliance of Cities.

Dane County Executive Kathleen Falk, who fought Comm 83 in an earlier form as state public intervenor, said the rule change would open about 25 percent of county land to development, especially in the hilly area on the western side.

"This is the single biggest land development decision the state will make in a decade," Falk said. "There will be more houses on hilltops. There will more houses along rivers and wetlands."

Rick Stadelman of the Wisconsin Towns Association, which supports the rule change, agreed it will have a "major impact" but said it will help preserve farmland because homes could be built in areas without good soil.

"I think it will improve the environment," said Larry Gleasman of the Realtors Association of South Central Wisconsin, another Comm 83 supporter. "It will allow us to redirect housing in the rural areas from farmland to nonproductive land. We could build in quarries."

Two public hearings on the rule change are scheduled this month. An Assembly Natural Resources Committee hearing begins at 10 a.m. Wednesday in Room 328 NW of the State Capitol. A Senate committee hearing is scheduled for Aug. 26.

After the hearings, the Commerce Department will decide whether to amend the rule change, then it can put it into effect. Legislators can change the rule by introducing bills that must be enacted into law.

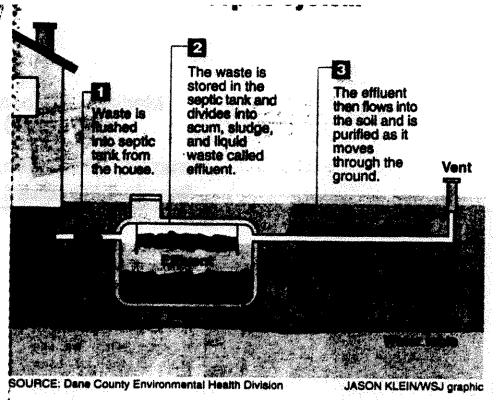
The rule change has been debated for years. Lawsuits over whether an environmental impact statement was required caused delays, and responsibility for the rule was shifted from one state department to another.

Carol Skornica, former secretary of the now defunct Department of

Please see SEPTIC, Page 10A

CRAIG SCHREI

Workers from Meinholz Excavating of Waunakee age trench Friday after installing a septic system home near Cross Plains. Unlike this conventiona new above-ground systems could be installed on sides and near lakes and wetlands.



SOURCE: Dane County Environmental Health Division JASON KLEIN/WSJ graphic

Septic

Continued from Page 1A

Industry, Labor and Human Relations, saw the rule change as a way to encourage new technology.

"Science is taking the outhouse into the Space Age," she said in 1995. "We think the new code will encourage new, effective and affordable technology to bloom instead of freezing old practices in amber."

Better than municipal

Mike Corry of the Commerce Department said the rule change would allow replacement of holding tanks with effective sewage treatment systems.

"These (new) systems produce an effluent quality equal to or better than that produced by municipal treatment systems," he said.

The new systems use sand filters, aerobic treatment or a mound system that is mostly above the ground. They need just 6 inches of soil depth to discharge the treated waste underground. Conventional septic systems need at least 2 feet of soil, which helps break down the waste.

"The main effect of the current code is to increase sprawl by causing lots already approved to be wasted," Corry said.

He said the state plumbing code shouldn't be used as a land use tool. People on both sides of the Comm 83 debate agree, but sewer services have been the most important land use control in Dane County for three decades.

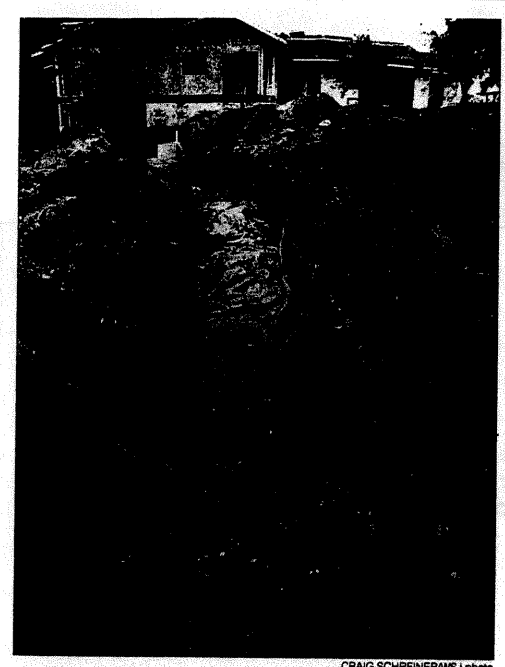
Large subdivisions must be developed in urban service areas, where municipal sewer and water are available. The Regional Planning Commission must approve urban service area extensions.

Dane County's land use system doesn't apply statewide. Of 1,265 town governments, Stadelman said, about 700 are under county zoning, 200 have town zoning and more than 300 have no zoning at all.

That's why environmentalists say the Comm 83 code changes should wait until other land-use controls are in place.

'Potentially dangerous'

"To unleash these new technologies in places of the state where local governments have not had the opportunity to plan and decide where they want growth to occur is premature and potentially dangerous," said Andrea Dearlove of 1,000 Friends of Wisconsin.



CRAIG SCHREINER/WSJ photo

Soil tests indicated this three-bedroom home on Enchanted Valley Road near Cross Plains would require 900 feet of seepage as part of its septic system. New above-ground septic designs don't need such trenches because they discharge treated effluent into the soil.

Dearlove said her organization supports a Smart Growth plan that would require land-use plans in place before Comm 83 goes into effect.

Stadelman said his organization supports land-use planning, but doesn't believe Comm 83 should be delayed.

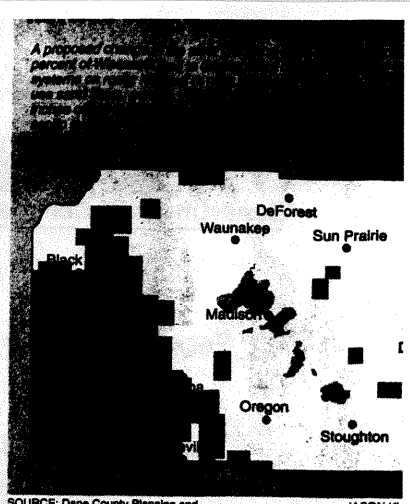
"Are we supposed to wait 10 years before we use these alternative systems?" he asked. "These issues are too complex to keep putting them off."

He said Comm 83 is important to towns because it could help resolve boundary disputes with cities and villages. People with failing septic systems now must annex to a city or village to connect to municipal sewers. With Comm 83, he said, they could install one of the new systems.

Corry said Comm 83 would strengthen the operation and maintenance of septic systems. But James Clark, director of Dane County's environmental health division, isn't convinced.

Clark, past president of the Wisconsin County Code Administrators, angered other Dane County officials during the early 1990s when he defended septic systems as effective in treating wastewater.

Now he says Comm 83 could lead to polluted wells and other serious public health problems because monitoring the new systems would be left to homeowners.



SOURCE: Dane County Planning and Development Department JASON KL

Monitoring necessary

"We're really taking a step backward if we don't have the mechanism in the code that will ensure monitoring of the treatment process," Clark said.

He said conventional septic systems that fail cause pooling above ground or back up into the house. The 2 feet of soil required in conventional systems helps break down untreated waste if the system fails.

But the new systems could fail and discharge polluted water under ground. Without adequate monitoring, Clark said, the failure could go undetected. Without well-drained soil, he said, t waste wouldn't be e down and could pollut

"The more I get i scarier it is envir Huck said, adding t couraged that the s ment of Natural Res been outspoken in Comm 83.

In an Aug. 12 let Madison attorney L said she believes Com crease the cost of test sibly replacing dri wells.

"It is my opinion t violates the federal S Water Act which prob derground injection which endangers dri sources," she wrote.

Instead of Comm 8 the new systems shou first. She agreed earl with the real estate builders to test new s in three rural Dane C visions with a maxi homes.

Wisconsin
Department of Commerce

P. O. Box 7970
Madison, Wisconsin 53707
(608) 266-1018

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

February 9, 1999

Theodore Rohloff, President
Wisconsin County Code Administrators
Calumet County Planning Department
206 Court Street
Chilton WI 53014

Dear Mr. Rohloff:

I am in receipt of a copy of your letter to the Chairs of the Joint Committee on Review of Administrative Rules regarding their recent suspension of a portion of s. Comm 83.03(2) relating to the connection of public sewers. The current rule requires that an owner abandon a septic system when a municipal sewer is available.

As you are aware, a provision is included in the proposed Comm 83 rewrite that would have the same effect as the temporary suspension of the rule by the Joint Committee for Review of Administrative Rules. The change is appropriate because the power to require abandonment and hookup is clearly vested by statute with the local sanitary district. The sanitary district has the power to require, not require or prohibit connection to the sanitary sewer. The continued presence of the provision in the code interferes with the sanitary district's power to make that decision.

The department does not feel it appropriate to retain a code provision that gives county code administrators, acting as state agents under the uniform plumbing code, the power to enforce provisions over matters delegated by the legislature to the sanitary districts, a distinct legal entity that may not desire the same result. If the county government wants to retain the authority, they should explore a local ordinance.

Because the Comm 83 rewrite is likely to face an extensive period of review, the department is proceeding with a separate rule change that will delete portions of Comm 82.03(2) from the current code. This will remove the necessity of a law change that would clutter the statutes with provisions restricting future code provisions in this area. I am sure you would agree that these matters are best handled by a code revision. The Joint Rules Committee's near unanimous vote to suspend the rule gives us a clear signal the provision needs revision.

Sincerely,

Brenda J. Blanchard
SECRETARY

cc: Governor Tommy G. Thompson
✓Senator Judy Robson
Representative Glenn Grothman

POWTS – The Germ Killer

Target - Fecal Coliform, an indicator bacteria, measure of treatment efficiency.

Found in the billions in digestive tracts of warm-blooded animals. Common in surface soils.

Discharge point	Typical Fecal Coliform Count – Col/100 ml H_2O	% Reduction
Sewer Pipe Outfall	50,000,000	
Municipal – No Disinfection (upper end of range)	250,000	99.5 %
Municipal – No Disinfection (lower end of range)	100,000	99.8%
POWTS (upper end of std.)	200	99.9996
Municipal – W/Disinfection	30-60	99.9999%
Single Pass Sand Filter POWTS	17[1]	99.999966%

[1] Most probable number, per gram dry soil

Wisconsin
Department of Commerce

SAFETY AND BUILDINGS DIVISION
Administrator's Office
P. O. Box 2599
Madison, Wisconsin 53701-2599

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

INDEX
COMM 83 BRIEFING MATERIALS

GENERAL DESCRIPTIONS

OF

COMMON TYPES

OF

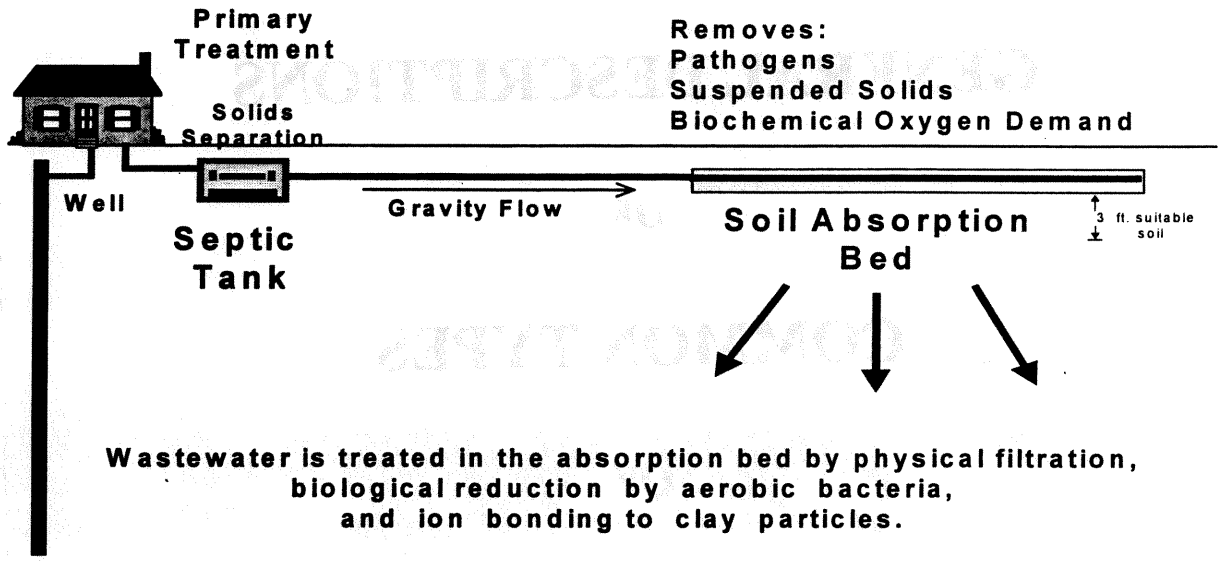
ONSITE SEWAGE SYSTEMS*

*Some of the systems described are not permitted for new construction under the current code in Wisconsin. See individual descriptions for details.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

Conventional In-ground System

Secondary Treatment in Soil Absorption Bed



Wastewater is treated in the absorption bed by physical filtration, biological reduction by aerobic bacteria, and ion bonding to clay particles.

A conventional in-ground septic system consists of a septic tank and a subsurface soil absorption bed. In the septic tank, solids settle out of the waste stream and anaerobic bacteria facilitate the partial breakdown of organic matter (primary treatment). Clarified effluent from the septic tank discharges via gravity to a soil absorption bed.

The soil absorption bed removes pathogens, organic matter, and suspended solids from the septic tank effluent via physical filtration, biological reduction of contaminants by aerobic microorganisms, and ion bonding to negatively charged clay particles. The soil serves as a fixed porous medium on which beneficial aerobic microorganisms grow. These organisms feed on organic matter present in the wastewater and help eliminate pathogens. Research indicates that 3 feet of suitable soil between the distribution trench and bedrock or high groundwater is sufficient to protect public health and groundwater quality. Because a conventional system includes a gravel distribution trench and overlying fill material, the system requires about 5 feet of suitable native soil.

The conventional system is a passive system that relies on gravity flow. The flow volume entering the septic tank controls the volume discharge to the soil. The discharge enters the distribution pipe via gravity, and usually drains out of the first few holes in the pipe, creating areas of favored distribution. This type of distribution can result in localized clogging along the trench as solids and bacterial biomass accumulates in these areas of preferential flow. The effectiveness of a conventional system depends on the type and permeability of native soils and the slope and drainage pattern of the site. The septic tank requires periodic pumping of accumulated solids, as well as inspection to determine that the tank remains watertight.

The conventional system is typically the least expensive system in use in Wisconsin and it is also the most common. These simple, passive systems that rely solely on unsaturated soil for wastewater treatment have been codified in Wisconsin since 1969 and could be used on 47% of the state's land area. They are also in use in most other states. In Wisconsin, they still constitute approximately 63% of all new systems installed and 57% of all replacements.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

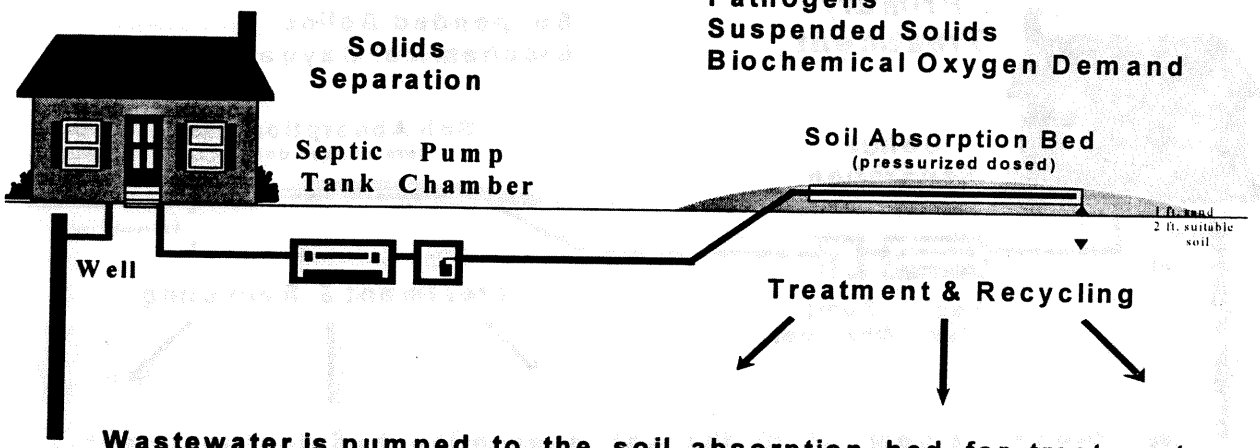
Wisconsin Mound

Secondary Treatment in Soil Absorption Bed

Primary Treatment

Solids Separation

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand



Wastewater is pumped to the soil absorption bed for treatment by physical filtration, biological reduction by aerobic bacteria, and ion bonding to clay particles.

A mound system, like a conventional system, consists of a septic tank and a soil absorption bed. In the mound system, however, sand is added where suitable native soil is insufficient. Clarified effluent from the septic tank is pumped, in controlled pressurized doses, to an aboveground, free-standing sand layer. The sand layer, placed upon a specially prepared area of native soil, serves as the medium on which aerobic bacteria facilitate much of the secondary treatment.
In a mound, the sand layer and native soil combined provide 36 inches of soil depth for treatment. Thus treatment is at least as effective as a conventional system. Delivering effluent to the soil absorption bed in controlled pressurized doses has some additional advantages. Wastewater is equally distributed, which reduces the chances for localized clogging. And the absorption bed has a "rest period" between doses that can result in superior pathogen and nutrient removal. Additional research over the past 20 years has provided increasingly effective specifications for mound geometry, sand characteristics, dosing frequencies, and loading rates.

Solids must be periodically pumped from the septic tank, as well as from the pump chamber to insure proper functioning of the pump mechanism. Proper site preparation protocols must be taken to prevent the leakage of effluent at the base of the mound.

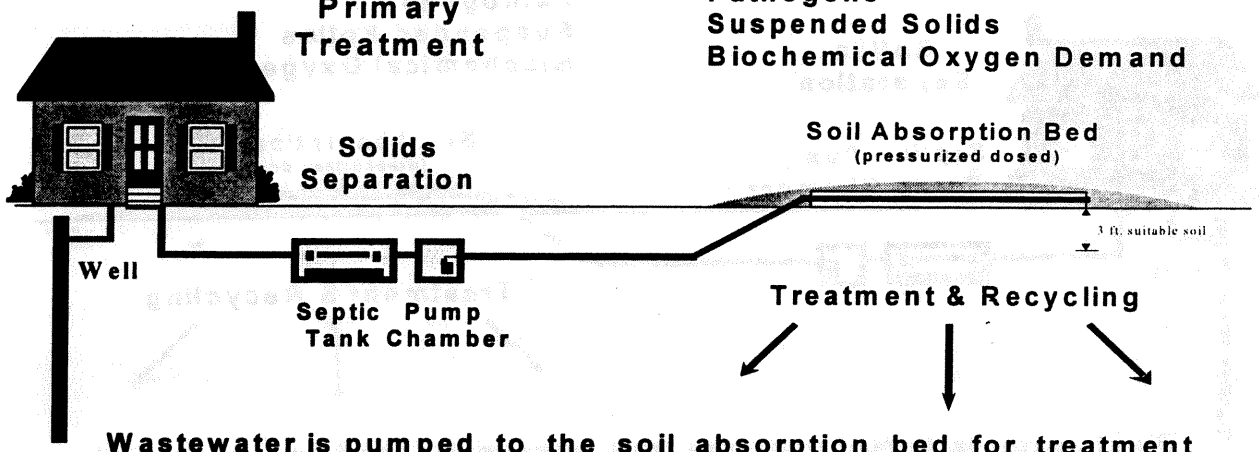
The use of sand as a medium for wastewater treatment, rather than native soil, is more than 100 years old. In Wisconsin, beginning in 1971, the legislature funded research intended to provide effective systems for sites where a lack of native soil prohibited a conventional system. The mound system using sand as a medium became available for general use in 1980, but new construction was restricted to sites with 24 inches of native soil. This increased the suitable land area by only 10 percentage points. There are no technical or public health reasons for this restriction. The proposed code will allow mound systems on sites with 6 inches of native soil, which will increase the suitable land area by another 25 percentage points. Currently, in Wisconsin, mound systems constitute approximately 20% of all new systems installed and 23% of replacements. These systems are also used in many other states.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

At-Grade

Secondary Treatment in Soil Absorption Bed

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand



Wastewater is pumped to the soil absorption bed for treatment by physical filtration, biological reduction by aerobic bacteria, and ion bonding to clay particles.

An at-grade system consists of a septic tank, pump chamber, pressure distribution system and a soil absorption bed. In the septic tank, solids settle out of the waste stream and anaerobic bacteria facilitate the partial breakdown of organic matter (primary treatment). Clarified effluent from the septic tank is typically discharged via gravity to a pump chamber from which it is pumped, in controlled pressurized doses, up to the soil absorption bed. At-grades are unique in that the distribution piping is placed on a prepared gravel bed at the ground surface, literally "at-grade". The distribution piping is covered with sand and soil to protect it from freezing.

Because the effluent is pumped upward to be dispersed just below the ground surface, the at-grade can be used on sites with as little as 36 inches of suitable native soil, rather than the 56 inches required for conventional systems (which disperse effluent approximately 20 inches below the surface). And, since the amount of above-ground sand fill needed is less, these systems tend to be less expensive than a traditional mound.

Solids must be periodically pumped from the septic tank, as well as from the pump chamber to insure proper functioning of the pump mechanism. Proper site preparation protocols must be taken to prevent the leakage of effluent at the base.

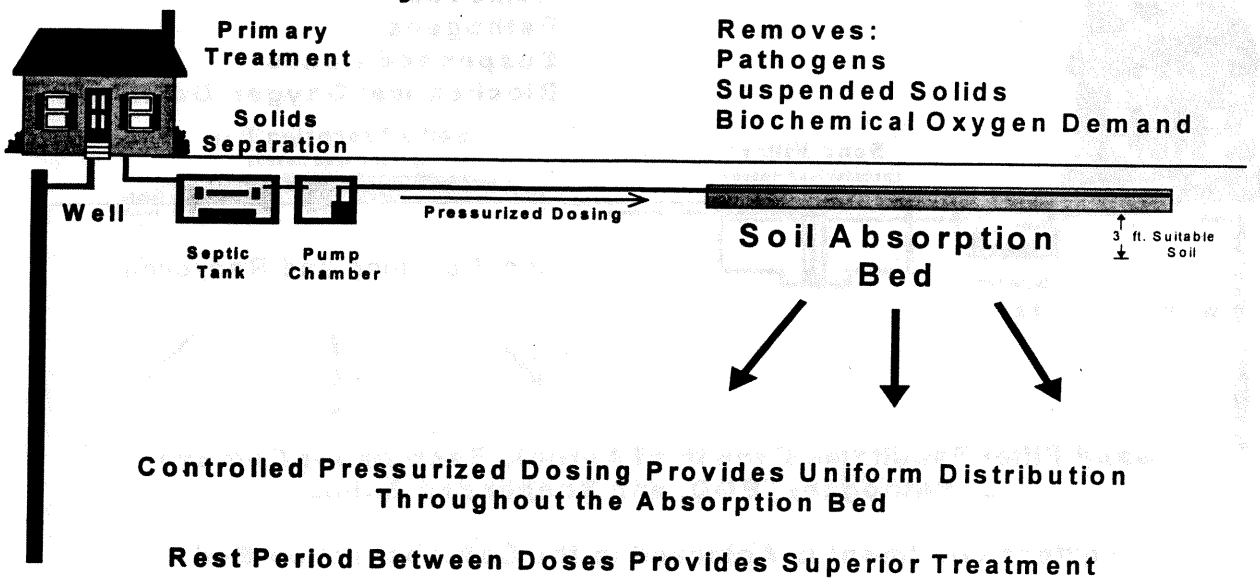
The at-grade design was developed in Wisconsin about 10 years ago, however, most components from which it is assembled, septic tank, pump and 36" soil absorption bed, have a long history in the state. Under the current code, at-grades are approved as experimental systems. The proposed code will approve them for general use. At-grade systems are estimated to constitute approximately 5% of new systems and 5% of replacements in Wisconsin.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

In-ground Pressure Distribution System

Secondary Treatment in Soil Absorption Bed

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand



Controlled Pressurized Dosing Provides Uniform Distribution Throughout the Absorption Bed

Rest Period Between Doses Provides Superior Treatment

An in-ground pressure distribution system consists of a septic tank, pump chamber, and a sub-surface soil absorption bed. Including space for the drain tile, gravel trench and overlying fill, the minimum native soil requirements range from 49 to 53 inches depending on the diameter of the distribution pipes. Like a conventional system, 36 inches of suitable native soil above bedrock or groundwater is required for the absorption bed.

The treatment mechanisms of in-ground pressure distribution systems are very similar to those of conventional systems, that is, 36 inches of native soil constitute a fixed porous medium on which aerobic bacteria provide secondary treatment of wastewater. The principle difference is the addition of a pump chamber that delivers septic tank effluent to the soil absorption bed in controlled timed doses. Delivering septic tank effluent in controlled pressurized doses ensures that the wastewater is equally distributed across the soil absorption bed, thus reducing the potential for the localized clogging that often occurs in conventional gravity dosed systems. Research has also shown that discharging effluent in controlled, properly timed doses gives the absorption bed a drying period between doses that can result in enhanced treatment with regard to pathogen and nutrient removal.

Septic tanks require periodic pumping of accumulated solids, as well as inspection to determine that the tank remains watertight. Solids must also be removed from the pump chamber periodically to insure proper functioning of the pump mechanism.

The components of these systems are not different than those of conventional and mound systems, which have a long history in Wisconsin. They are used under the current code. Their advantage is the potential of less clogging of the soil absorption bed. In Wisconsin, permits for in-ground pressure distribution systems constitute a very small number of the new systems and replacements--less than one-half of one percent.

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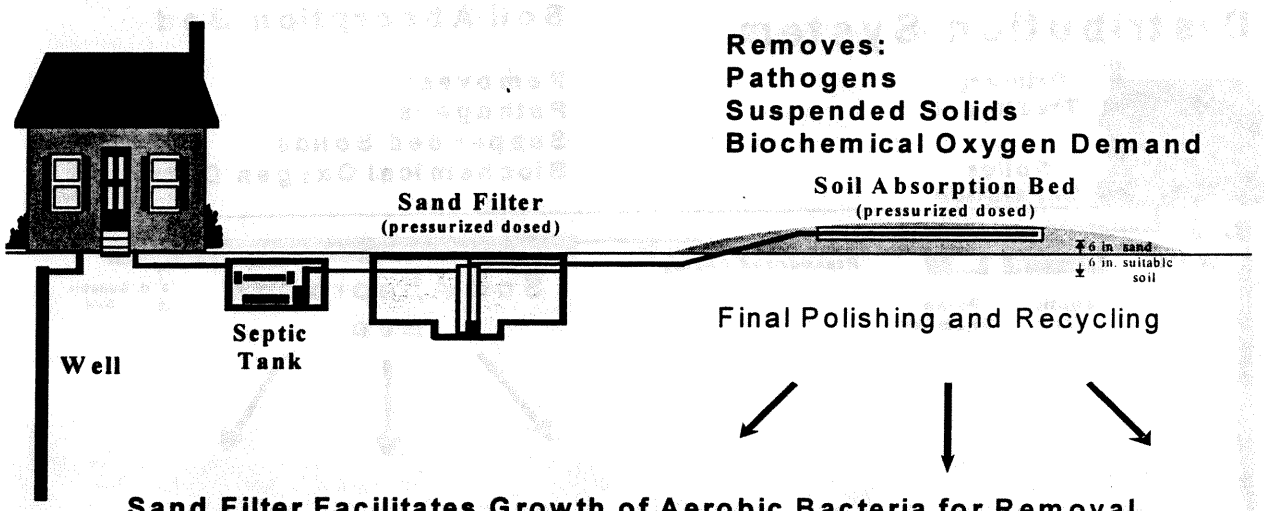
Sand Filter
(Single-Pass)



Secondary Treatment From Sand Filter & Soil

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand

Sand Filter Facilitates Growth of Aerobic Bacteria for Removal of Pathogens, BOD, and Suspended Solids

Further Treatment is Achieved in the Soil Absorption Bed

A single-pass sand filter consists of a septic tank, sand filter and soil absorption bed. In the septic tank, solids settle out of the waste stream and anaerobic bacteria facilitate the partial breakdown of organic matter (primary treatment). Pressured doses of clarified effluent from the septic tank are discharged to the sand filter. The sand filter, commonly referred to as a "mound in a box", is a buried chamber containing at least 24 inches of sand between layers of gravel. It serves as the fixed porous medium on which aerobic bacteria provide much of the secondary treatment. The effluent from the sand filter is then discharged, in pressurized doses, to a soil absorption bed.

Because the effluent from the sand filter has already been treated by passage through 24 inches of sand of an approved size and consistency, the soil absorption bed could potentially be reduced to 12 inches of suitable native soil. And, because the sand layer is underground, the potential landscaping disadvantages of an above ground mound are alleviated. Also, since the sand filter treats wastewater within an enclosed structure, the sand can be replaced easily should the need arise.

As in all systems, septic tanks require periodic pumping of accumulated solids, as well as inspection to determine that the tank remains watertight. Solids must also be removed from the pump chambers periodically.

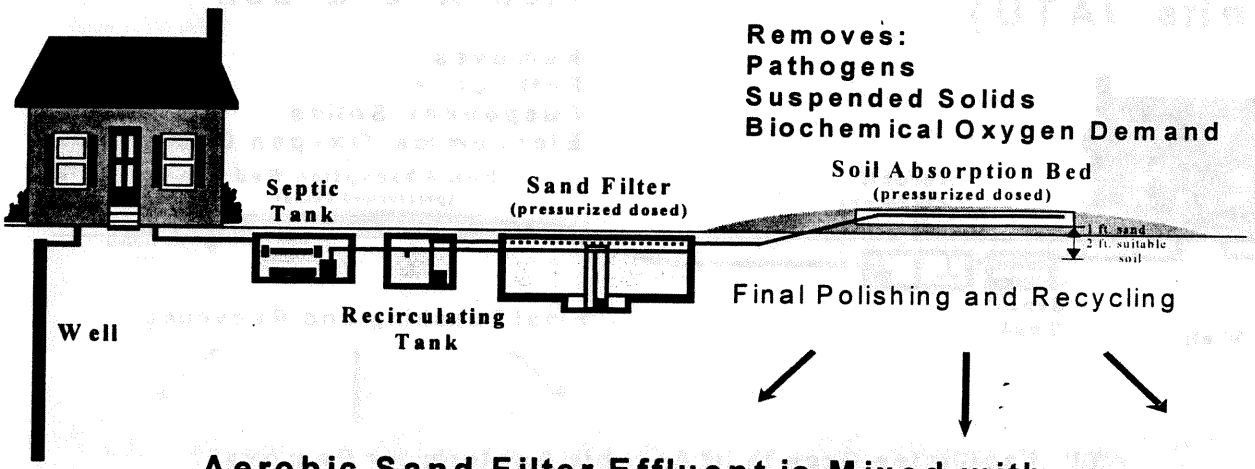
Sand filters have been used to treat domestic wastewater over a hundred years. About 45% of the health departments nationwide that responded to a recent survey stated that they permitted the use of sand filters. The industry estimates that there are approximately 15,000 systems in use nationally. The version described in the figure above has been used extensively as an experimental system in Wood County, Wisconsin with very satisfactory results. The proposed Comm 83 code would make it available for general use in the state.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

Recirculating Sand Filter

Secondary Treatment From Sand Filter & Soil

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand



Aerobic Sand Filter Effluent is Mixed with Anaerobic Septic Tank Effluent to Remove Nitrogen

Removes 40% - 70% of Total Nitrogen

A recirculating sand filter consists of a septic tank, recirculating tank, sand filter and soil absorption bed. In the septic tank, solids settle out of the waste stream and anaerobic bacteria facilitate the partial breakdown of organic matter (primary treatment). Pressured doses of clarified effluent from the septic tank are discharged to the recirculating tank and from there to the sand filter. The sand filter is a buried chamber containing at least 24 inches of sand between layers of gravel. It serves as the fixed porous medium on which aerobic bacteria provide much of the secondary treatment. Pressurized doses of a portion (typically 20%) of the effluent from the sand filter are dispersed to the soil absorption bed, while the remainder (80%) is returned, mixed with incoming septic tank effluent, and passed through the sand filter again. This design takes advantage of the high concentration of organic matter and anaerobic conditions of the septic tank effluent; conditions which are necessary for nitrogen removal.

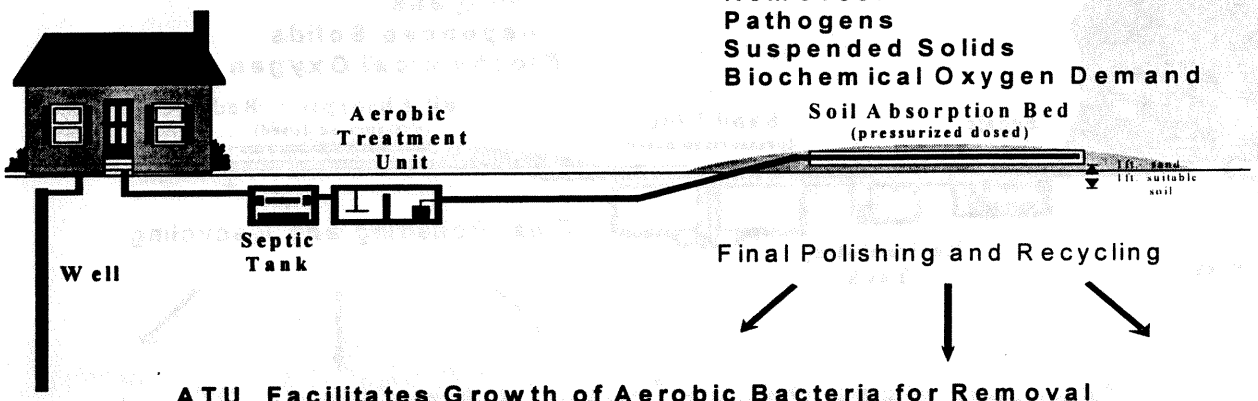
The primary advantage of these recirculating sand filters is that they are capable of removing from 40 to 70% of the total nitrogen present in the septic tank effluent. Although effluent from the sand filter will have been treated by passage through 24 inches of sand, due to the recirculation step the coliform level of the effluent is higher than that of the single pass filter. The soil absorption bed could potentially be reduced, but the amount of reduction would depend on the quality of the effluent. Because the sand layer is underground, the potential landscaping disadvantages of an above ground mound are alleviated. Also, since the sand filter treats wastewater within an enclosed structure, the sand can be replaced easily should the need arise.

Septic tanks and pumps require periodic pumping of accumulated solids. For optimum treatment and nitrogen removal, the adjustment of the proper recirculation ratio and sand filter loading rates is critical.

Sand filters have been used for wastewater treatment over a hundred years. Development of recirculating systems, however, began in the 1960s in an effort to remove more nutrients such as nitrogen from domestic wastewater. These systems are not approved for general use in new construction in Wisconsin, but they have been used as experimental systems for about 10 years.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

Aerobic Treatment Units (ATU)



Secondary Treatment From ATU & Soil

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand

ATU Facilitates Growth of Aerobic Bacteria for Removal of Pathogens, BOD, and Suspended Solids

Further Treatment is Achieved in the Soil Absorption Bed

An Aerobic Treatment Unit (ATU) is a self-contained unit that uses blowers or propellers to aerate the wastewater. They may also have filters to remove suspended solids. The additional electrical components are no more complicated than those commonly used in mound systems. An onsite sewage system that incorporates an ATU has either a septic tank or contains a septic compartment for solids separation, followed by the ATU, and a soil absorption bed.

ATUs are initially seeded with bacteria to provide a suspended medium for the growth of aerobic microorganisms that remove organic materials from the wastewater Wastewater is dispersed to a soil absorption bed. Depending on the amount of treatment the wastewater receives in the ATU (quality of the effluent leaving the ATU), treatment required of the soil absorption bed will be reduced, providing the potential to reduce the size of this bed. Thus, ATUs can be used where there is insufficient soil for the standard 36 inch vertical separation to groundwater or bedrock. Since effluent from the ATU is an aerobic product with low concentrations of BOD, it can also be used to rehabilitate an existing soil absorption bed that is clogged with microbial biomass.

Solids must be periodically pumped from the septic tank and the pump chamber. The ATU unit itself must be pumped at regular intervals to maintain a balance in the microbial fauna. Events such as a prolonged disruption of electrical service could disrupt the balance and require the tank to be pumped, reactivated, and re-seeded. These units should be inspected by a professional every six months or whenever an alarm is activated.

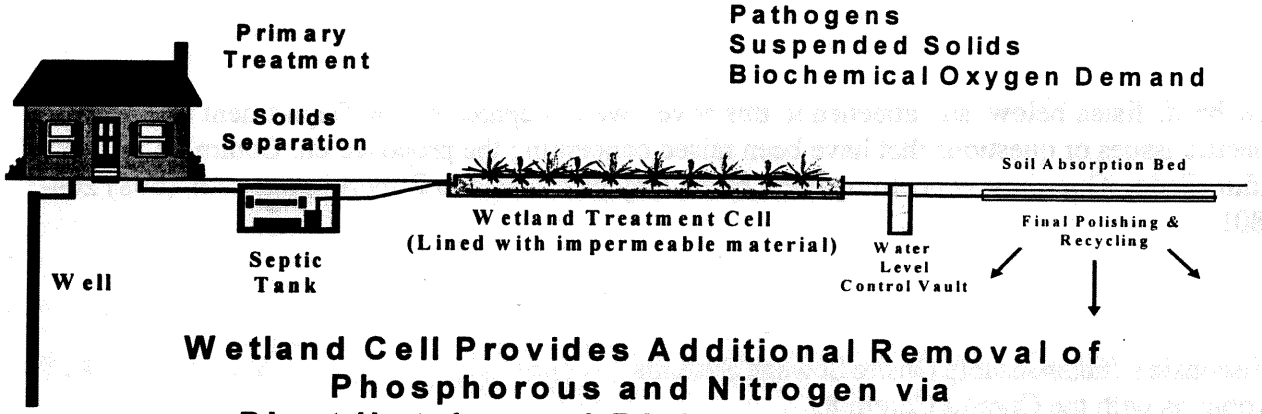
Although the use of suspended media is relatively new for small scale onsite sewage systems, municipal plants have used suspended aerobic media for successful secondary wastewater treatment since the early 1900s. Under the current code, ATUs have been used in Wisconsin for approximately 10 years with currently approved systems, experimental systems and to rehabilitate existing systems and they are used in many other states. The proposed Comm 83 would allow systems that use ATUs with proven treatment capability to reduce the vertical separation of the soil absorption bed to 24 inches.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

Constructed Wetlands

Secondary Treatment From Wetland & Soil

Removes:
Pathogens
Suspended Solids
Biochemical Oxygen Demand



Wetland Cell Provides Additional Removal of Phosphorous and Nitrogen via Plant Uptake, and Biological - Chemical Transformations

A constructed wetland system consists of a septic tank, one or more wetland treatment cells, and a subsurface soil absorption bed. In the septic tank, solids settle out of the waste stream and anaerobic bacteria facilitate the partial breakdown of organic matter (primary treatment). Septic tank effluent is pumped, in controlled pressurized doses, to a discrete wetland cell which is designed to create and incorporate the treatment processes of natural wetlands. Effluent from the wetland treatment cell is then discharged to a soil absorption bed.

A typical wetland cell consists of an underlayer of pea gravel, overlain by soil that will support submergent and emergent wetland vegetation. The cell is lined with a layer of impermeable material to separate it from native soils and hydrological conditions. The water level is maintained below the gravel surface, thus preventing odors and public exposure to the wastewater being treated. In some cases, the cell is covered with a greenhouse. The wetland treatment cell removes organic matter, suspended solids, pathogens and nutrients through biological transformations, plant uptake and adsorption to soil particles. Some disinfection is achieved by exposure to UV light from the sun.

Costs for constructed wetlands vary significantly. They tend to be more expensive than most other onsite sewage systems because of the earthwork, land, structures, and design. However, depending on plant selection and design, they can also be very aesthetically appealing.

Solids must be periodically pumped from septic tanks and pump chambers and the treatment cells must not be overloaded. Minimum flow conditions are required to maintain the proper flora and fauna, and plants must be carefully selected to thrive in the specific conditions.

Development of constructed wetlands for wastewater treatment began in the early 1970s. They are recognized as effective by the Environmental Protection Agency and are used in states such as Minnesota and Iowa. Two nature centers in the Upper Midwest, one in Iowa and one in Wisconsin, are using these systems very effectively. These systems will be approved individually under the proposed code. No design has yet been submitted for general use.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings. Version date 2/8/99

Wisconsin
Department of Commerce

P. O. Box 7970
Madison, Wisconsin 53707
(608) 266-1018

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

The briefs listed below, and attached to this cover, were prepared by the Department to address specific issues or questions that have been raised concerning the proposed ch. Comm 83, Wis. Adm. Code. Questions concerning these briefs may be directed to Robert Langstroth, (608) 264-8801.

Wisconsin's Indispensable Onsite Sewage Systems
Problems with the Current Comm 83
Mounds: Current and Proposed. Same System, Same Three Feet of Soil Treatment
Proposed Comm 83 Critics: Deja Vu All Over Again
New Comm 83 Regulations: Will 8.9 Million Acres Be Affected?
Is Development Expected to Increase under the Proposed Code?
Comm 83: Better Technology and Land Use Options
Comm 83: New Options: Old Technology
Comparison of Performance: Municipal and Onsite Wastewater Treatment
Wastewater Treatment Options for Small Communities
Manage to Improve Maintenance of Onsite Sewage Systems
Water Down the Drain: Re-use It or Lose It

Wisconsin's Indispensable Onsite Sewage Systems

Onsite sewage systems are essential to construction in 96% of Wisconsin's land area. They serve 30% of the state's residences. Approximately 93% of these are in townships. Wherever low density or low numbers of contiguous developed lots make centralized systems too costly, there you will find the public health needs of the State served by onsite systems.

Wisconsin has approximately 700,000 residences and 24,000 commercial or public buildings served by onsite sewage systems. For the northern counties of Burnett, Sawyer, Vilas, Oneida and Florence and the Southcentral county of Adams, onsite systems serve over 80% of the housing units. Many rest stops and camping facilities rely on these systems.

Growth is steady. Approximately 12,000 new systems are installed annually. Interestingly, this growth is not dependent on population. Statewide, the number of residences served by onsite sewage systems has been increasing at a rate of about 2% annually (about 12,000 systems), compared to about a 1% increase in population. New onsite systems exceed new population in 21 counties. Thus many new onsite systems are serving second homes and tourist facilities.

The highest total number of onsite systems (37,600) is found in Waukesha County, which also has the highest number of systems per square mile (64). Dane, Oneida and Vilas counties each have over 20,000 systems; their numbers per square mile are 20 or less.

Technological change is slow. In 1969, the State adopted the first modern onsite sewage system regulations. These permitted conventional systems-- a septic tank which discharges below the surface into 36 inches of suitable native soil. In 1979, rules were promulgated that allowed mound systems--which permitted fill to replace native soil. Since 1980, 70% of newly installed and 60% of replacement systems have been conventional. Permitted options which require less native soil such as at-grades and mounds are still only about 20% of newly installed systems. Holding tanks make up the remainder.

Holding tanks are used where the current code does not allow other options. In some counties, such as Clark and Taylor, holding tanks are more than 70% of new systems. For fulltime residences, holding tanks are expensive because tanks must be frequently pumped. For infrequently used seasonal homes, holding tanks may be the best solution in terms of both costs and protection of public health. Under the current code, holding tanks cannot be installed if a site will accommodate a conventional or a mound system. This may force a homeowner to use an expensive, and a less effective, alternative. The proposed code permits treatment systems where holding tanks are now required.

Since public sewers reach only 4% of Wisconsin's land area, construction and growth in the rural and suburban lands of the state will continue to rely on onsite sewage systems to meet wastewater treatment needs. These systems are highly cost-effective, safe and indispensable to the citizens of Wisconsin.

Prepared by the State of Wisconsin Department of Commerce, Division of Safety and Buildings: Version date 2/1/99

Problems with the Current Comm 83

Chapter Comm 83, Wis. Adm. Code, was originally promulgated in 1980 as an emergency rule (ch. H 63) by the Department of Health. In 1983, it was renumbered as ILHR 83 when the private sewage program was transferred to the Department of Industry, Labor, and Human Relations. The Department of Commerce was created in 1996 and the chapter was again renumbered as Comm 83 in early 1997. Despite the changes in name and number, the rules have not been substantially revised since 1980. In 1992, a code development process was initiated to bring about a revision and rewrite of the private sewage rules. The first draft of the new rules were released for public comment in 1995 and the final public hearing draft was released in 1998. These rules are scheduled to be forwarded to the Legislature early this year (1999).

Why has so much effort gone into this process? It is because the current rules are in need of major revision and rewrite. Pertinent reasons why the current rules are now considered obsolete include:

- Too many code interpretations and memoranda. The current rules, as published, are not complete. In order to properly administer the rules, local authorities must also refer to a set of over 150 code interpretations and memoranda issued by the Department. Since these are not codified, they have earned the nickname of "mem laws" among local administrators.

- No allowance for the use of technologies not prescribed in current code without administrative rulemaking process. The current rules do not specify a process for the recognition or approval of wastewater treatment and dispersal technologies not already embodied in the rules. In the absence of a codified process, the code itself must be changed if a new option is to be allowed. This has resulted in a falling off the pace of technological advancements in onsite wastewater treatment. There are many excellent technologies that cannot be used in Wisconsin simply because the current rules are not flexible enough to allow them. This puts many Wisconsin citizens, as well as the state's groundwater, at a disadvantage. Some property owners of lots zoned for residential use cannot build simply because of the limited range of onsite sewage system options prescribed by the current rules.

- Restriction of use of mounds for reasons not related to public health, safety, or groundwater protection. Mounds on sites with less than 24 inches of native soil are currently allowed for replacements, but not for new installations. There is absolutely no technical basis for this rule. Mounds work well on sites with as little as six inches native soil. Many property owners resort to installing a holding tank, so that they can legally replace it with a mound system.

- Continued classification of at-grade systems as experimental despite widespread use. The at-grade system was developed because the specification for a mound system in the current code is a "one size fits all" approach. The mound was originally designed in 1979 to allow systems for soils with 24 to 56 inches of suitable soil. The rigid specifications promulgated in the code resulted in adding unnecessary expensive fill on some sites which was not needed for treatment. The design of the at-grade system was a response to that problem but, because of the inflexibility of current code, it cannot be approved for general use.

- Inadequate addressing of retroactivity of systems installed prior to statewide minimum standards. Selective practices have been used to order the replacement of existing systems that do not meet the design standards of the current code.

- Absence of a range of responses to POWTS-related exceedences of groundwater protection standards. The Statutes require all state agencies to promulgate by rule a range of responses to violations of the groundwater protection standards caused by acitivities, practices, or facilities they regulate. The current rules do not fulfill this requirement.

- No rules related to experiments and experimental systems. While the Department has funded experimental programs related to onsite sewage systems and issues significant numbers of sanitary permits for experimental systems, the rules do not provide any guidelines for these experiments.

These are some examples of problems or voids that exist in the current code. The longer the Department must wait to fix these, the more difficult it will be to do so.

Mounds: Current and Proposed
Same System, Same Three Feet of Soil Treatment

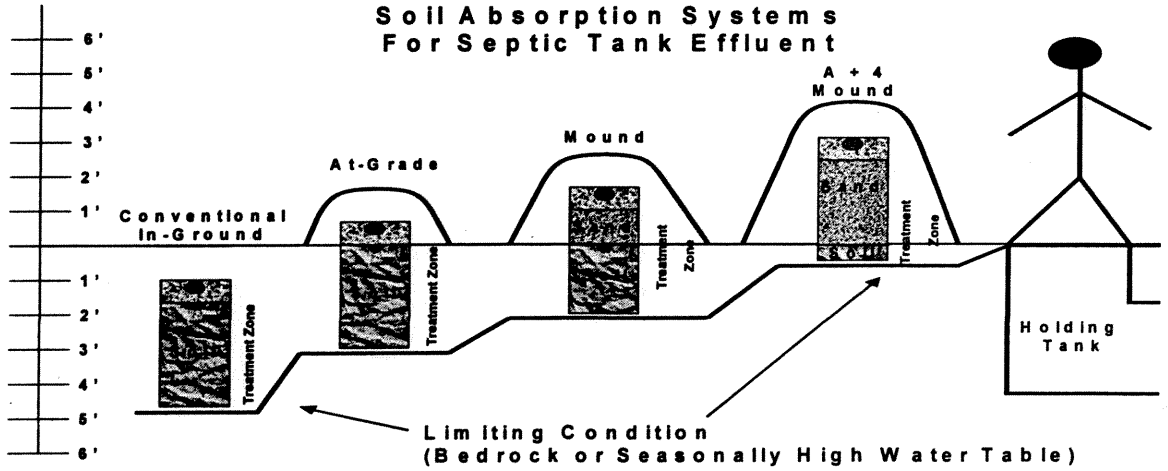
In contrast to the current onsite sewage system rules, the proposed Comm 83 will allow mound systems to be used on new construction sites with less than 24 inches, but at least 6 inches, of native soil. The current rules have allowed these types of mounds, commonly referred to as "A+4 mounds", for replacement sites for the past ten years.

There is no technical or public health reason not to install mounds on new construction sites with less than 24 inches native soil. The only difference between mounds allowed under the current code and those that would be allowed under the proposed code is the proportion of sand fill to native soil. All mounds have a minimum of 36 inches unsaturated soil material of some suitable type for treatment of wastewater.

All mound designs have a 5-foot profile like that of the conventional system: from top to bottom, 8-12 inches of cover, 10-12 inches for the wastewater distribution (gravel and pipe) and three ft. of soil (the soil treatment zone). In the mound design, a portion of this 5-foot profile is simply elevated above the ground. The soil treatment component of a conventional system is composed entirely of *in situ* soil. A mound soil treatment system contains from 6 to 24 inches of *in situ* soil, capped by 12 to 30 inches of engineered sand fill, for a total of 36 inches. The accompanying illustration provides a comparison of the different mound designs.

Mounds have numerous advantages over conventional systems. Unlike conventional systems, most mounds use timers to control the flow of wastewater to the drainfields and pressurized distribution systems to distribute the wastewater evenly throughout the drainfield. Intermittent doses allow the system to have a "rest period". The result is superior and more consistent removal of organic material, solids, and pathogenic bacteria. Also, because the sand fill is of known and controllable properties, mound systems are less sensitive to the effects of natural variability that may reduce the treatment effectiveness of native soil.

As stated previously, there is no technical or public health reason not to install mounds on new construction sites with less than 24 inches native soil. Objections to these systems are based on perceptions related to land use. Comm 83 is a health code, not a land use code.



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Proposed Comm 83 Critics: Deja Vu All Over Again

In 1979, the Department of Health and Social Services proposed new regulations for onsite sewage systems that would allow variations on the conventional system (these were called mounds). These new options utilized varying depths of sand to compensate for a lack of suitable soils. Critics said: *there is insufficient evidence that the new components will protect public health; the new code increases the burden on local administrators; the new code will encourage urban sprawl with consequent adverse impacts on habitats and farmland; and the Environmental Impact Statement (EIS) does not meet WEPA requirements.*

In 1999, the Department of Commerce proposes new regulations for onsite sewage systems that will allow additional options. These options utilize additional sand or other mechanisms to compensate for a lack of suitable soils. Critics say: *there is insufficient evidence that the new components will protect public health; the new code increases the burden on local administrators; the new code will encourage urban sprawl with consequent adverse impacts on habitats and farmland; and the EIS does not meet WEPA requirements.*

The public health was and will be protected. The mounds allowed in 1979 had been well tested and proven effective. Their effectiveness has not been called into question in the succeeding 20 years. The options that will be permitted by the proposed 1999 code will be well tested and proven effective. The systems proposed for new construction have been used in Wisconsin or other states for a number of years.

The burden on local administrators *has* increased since 1979. It will continue to increase with or without a new code. This burden is primarily due to the increasing number of onsite sewage systems in the state. True, there is a learning curve for new options. But continuing education is required for credentialed personnel. And continuing education related to the new options has been provided over the past five years. As other new options come along, the training will be provided.

The real issue for critics is land use. Critics of the proposed code believe that the current code effectively restricts what they perceive as an adverse impact, "sprawling development." They fail to acknowledge that the current code also makes it difficult to build on lots zoned for residential construction.

The "sprawl" phenomenon has been occurring for decades, in sewered subdivisions as well as with onsite sewage systems. It is adverse in some situations and beneficial in others, depending on the specific situation and on the observer. The situation on the urban fringe, for example, may be totally different than that in the Northern counties or other parts of the state. Zoning authority at the local level allows local governments to decide how to handle unique situations and local preferences.

A delay of the code to allow additional development of comprehensive zoning has been suggested. A delay was also suggested in comments on the EIS in 1979, ample evidence that the need for comprehensive zoning has been recognized for a long time and its absence will not be corrected by additional delays in onsite sewage system regulations.

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The final word on the land use issue in the 1979 EIS was, "It has been asserted that soils unsuited for conventional septic systems represent a kind of beneficent, de facto 'zoning' which keeps development from scattering over the countryside. ... Protection of such areas [environmentally sensitive] will require a reliance not upon any presumed system of de facto zoning, but rather upon a man-made system of zoning and other means of land use control. Generally speaking, the data, conclusions, etc., reached relative to the three existing mounds will apply to any additional "alternative designs" developed in the future." That is also the conclusion in 1999.

The Environmental Impact Statement in 1979 did meet WEPA requirements. Likewise, the Department believes that the current Environmental Impact Statement also meets WEPA requirements.

New Comm 83 Regulations: Will 8.9 Million Acres Be Affected?

Critics have claimed that an additional 8.9 million acres can be developed under the proposed Comm 83. The Environmental Impact Statement (EIS) does **not** state this. It states that there are 8.9 million acres in the state with from 6 to 24 inches of soil to bedrock or high water. Nowhere does the EIS state or imply that these are 8.9 million acres that **cannot** be developed now, or that **can** be developed if the proposed code is promulgated.

What, exactly, is the 8.9 million acres? It is the sum of the areas of all soil mapping units in the state of Wisconsin multiplied by the percent of each unit for which soil depth is between 6 and 24 inches. It is based on USDA data. These data represent the state's 35 million acres as 128 mapping units. Maps resulting from these data have a maximum resolution of about 2 square miles. Each individual mapping unit is composed of variable sized components with a specific range of soil depths. For example, if a given unit has 25% of its area in components where soil depth is less than or equal to 6 inches, and 50% of its area in components where soil depth is greater than 24 inches, then it has 25% of its area in components where soil depth is between 6 and 24 inches. The 8.9 million acres is the sum of the areas where soil depth is between 6 and 24 inches.

In theory, if we look at a 2 square mile area (1,280 acres), using the percentages in the example above, we would calculate that 320 acres have between 6 and 24 inches soil depth. If we assume 1 acre lots, and a .5 acre for each lot for transportation and utility needs, the 2 square mile area has room for 853 lots. Under the current code, 426 of these could be developed with onsite sewage systems. Under the proposed code, 640 could be developed with onsite systems. The remainder would require a holding tank, but could be developed under either code.

The reality is somewhat different. The land with from 6 inches to 24 inches of soil depth is not in contiguous unused parcels. It is scattered across Wisconsin. It occurs in cities and previously developed subdivisions as well as in rural areas. It occurs in land under conservation and land zoned for other than residential purposes as well as land zoned residential. To find the land that would actually become available for development would require first determining what land not previously developed is zoned for residential development, and then taking a minimum of three soil borings per lot to determine if the lot had any pockets of land suitable for an onsite sewage system. These lands may be found in farmland. They may be found in previously undeveloped areas. And they may be found in previously developed subdivisions where the lots are currently wasted because they do not have access to an onsite sewage system. Thus the reality for any given 2 square mile area is that we don't know. It's like locating people. We know that there are about 5 million people in the State of Wisconsin. We don't know how many are on a given square mile unless we go out and count them.

The 8.9 million acres is an abstraction. It does not exist as any identifiable area in any specific place. Because it is an abstraction, it cannot take into account any other factors such as zoning, previous development, etc. It is a mistake to identify it as "developable" land.

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Is Development Expected to Increase under the Proposed Code?

No! Although that was a result of the proposed code that was intuitively unexpected, the evidence did not support it. At first glance, it seems obvious that if more land were available for development then there would be more development. But to support that hypothesis, we would need to show that there was a check on current development and that the proposed code would remove that check. The evidence on an overall, that is, statewide, level did not support that conclusion. That evidence includes:

1) **Supply** There are approximately 20 million acres available under the current code with approximately 20 potential drainfields per acre. With that amount of supply, anyone who wants to build in the country now could find a site. It might not be the particular site they want, but they can find some site.

2) **Distribution** The "supply of land" suitable under the current code is distributed in pockets across the state according to the National Resource Conservation Service, from which we got the data. Our own data on sanitary permits was evidence of what that meant for system installations. Springdale (p. 58 in EIS) is one example, though there are many others. The mapping units that cover Springdale show a predominance of unsuitable soils, but both the growth rate since 1990 and the current density are higher than the statewide averages. So sites are being found. In section 4.9, the EIS shows areas that will have the most "change" in supply. But the sanitary permit data for these areas also show that conventional systems are still the majority of new systems, so people are finding pockets of land with 3ft soil depth. Even in these areas, there is no evidence that people are unable to find sites now.

3) **Technological change** A past change in technology which affected suitability of sites did not result in higher levels of development (trend data on sanitary permits in EIS p. 36). Mounds were introduced about 1980, so one would expect there to be an increase in the following years if increases are due to changes in onsite system technology. There was actually a precipitous drop, due to economic conditions at the time.

4) **Numbers of permits** If people are unable to find sites now, we should be seeing a steady downturn in sanitary permits (EIS p. 41) despite the continuing strength of the economy. We're not.

5) **Type of technology** If the supply of sites with 3 ft soil depth were insufficient, we should be seeing a more marked shift to mounds than we are seeing. After 20 years, mounds have still only reached approximately 20% of total new systems. Conventional and at-grade systems are approximately 65%.

All of these indicate that, in an overall sense, demand for sites is being met under the current code. There are individual problems or inequities in the sense that some people cannot use a particular site that they want to use. There is also some wastage, in that some subdivisions contain lots that cannot be used, thus require more land to achieve the desired number of lots. What we've said in the EIS is that yes, we may see development on some *sites* where we wouldn't have seen it without the proposed code, but we won't see a statewide increase because if it's on that site, it won't be on some other site.

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COMM 83: BETTER TECHNOLOGY AND LAND USE OPTIONS

by

Phil Albert, Acting Secretary
Department of Commerce

In January 1999, the Department of Commerce (COMMERCE) will send its revised COMM 83 code to the Legislature for approval. COMM 83 is a health and safety code that sets standards for private septic systems. We revised COMM 83 because the current code limits access to safe, effective septic technologies. The debate over the adoption of COMM 83, however, has often seemed to focus on land use issues.

Opponents of the revised COMM 83 note that Wisconsin contains nearly 9 million acres of land that is predominantly unsuitable for septic systems or mounds. They describe this land as if it were comprised of large, pristine tracts of Wisconsin countryside, and contend that with the adoption of COMM 83 bulldozers will start gobbling it up for development. In fact, the 9 million acres are scattered across every township in every county of Wisconsin—an acre here, an acre there, in towns, rural areas, and cities. For example, 39 percent of the land area of the City of Wauwatosa is included in the 9 million acres.

Currently, lots that are planned and zoned for residential construction, and ready to receive water and electricity, can be judged unbuildable for lack of access to an improved septic system. These residentially-zoned sites are in effect wasted. As a result, subdivisions range over a larger area than would be the case if the code allowed technology suited to the site. In addition, the sites meeting the current code requirements for conventional septic systems or mounds are often found on farmland because these soils are typically deep and well-drained. This may set up a residential-agricultural use competition on farmland that is recognized worldwide for its productivity. The revised COMM 83 could aid in ending this competition by permitting residential development on land unsuitable for farming.

The other argument made by the revised code's opponents is that the old code was useful in containing urban sprawl, and that the revised code will promote it. But this argument is false. Urban sprawl is already with us. It has occurred wherever local zoning practices have allowed it to occur. No development of any kind can occur in any community if prohibited by local zoning rules.

In summary, then, the old code limited individual choices without yielding any resulting land-use benefit. By providing treatment options, the revised COMM 83 can encourage more efficient land use.

We recognize that the revised COMM 83 will raise technical, administrative and enforcement issues for local governing bodies. Through this winter, COMMERCE staff is conducting statewide training on the code and related issues. In addition, Mike Corry, administrator of (COMMERCE) Division of Safety & Buildings, is available to brief local governments on the code and to answer questions. He can be reached at 608/266-1816 or at 201 W. Washington Ave., P. O. Box 2599, Madison, WI 53701.

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COMM 83:
New Options: Old Technology

by
Phil Albert, Acting Secretary
Department of Commerce

High tech? Complex? Dangerous to public health? NOT! The adoption of the revised onsite sewage system code will provide new options to homeowners, planners, and builders when they are considering siting and building a new home. But none of these systems are high-tech or exotic. They have been used successfully in numerous other states and as replacement systems in Wisconsin for many years.

All wastewater treatment systems, including municipal systems, use similar processes to achieve the same results: separate solids, remove organic material and reduce the number of bacteria. The difference is that some use media other than native soil to treat wastewater, in contrast to the conventional system, which requires three feet of native soil for treatment and dispersal of wastewater.

Two new treatment options are sandfilters and aerobic treatment units. Sandfilter technology has been available in the United States for at least 100 years. It is now used in several states, in Massachusetts, Maryland, Washington, Minnesota, and Oregon, where it was developed. Commonly referred to as a "mound in a box," a sandfilter is a buried chamber containing at least two feet of sand. An advantage of the sandfilter is that it is installed below ground, thus promoting ease of landscaping. The system discharges wastewater from the septic tank to the sandfilter, and then to soil. Because the sandfilter replaces two feet of native soil, it reduces or eliminates the elevation of the mound, which promotes easier landscaping. The new code will recognize both single-pass and recirculating sandfilters.

After careful study, the Wood County Board of Supervisors passed a unanimous resolution in August 1998 supporting the revised COMM 83 code. Wood County was the pilot for the installation of sand filter systems in soils that usually require holding tank systems. It found that the sand filter systems were superior to municipal treatment systems in treating household wastes and producing a very high quality of water for final disposal. The board concluded that the use of these systems would ultimately result in less environmental degradation, lower long-term costs for homeowners, and reduced costs for county management.

Aerobic treatment units have been in use in Wisconsin since 1990. These systems use a small compressor to force air through the wastewater before it is dispersed to the soil. This promotes the growth of bacteria that consume organic substances. These units have been used to rehabilitate clogged conventional systems. Because the bacteria accomplish effective pre-treatment, these systems can be installed on sites with only two feet of native soil or with other impediments.

Mounds are currently allowed for new construction in Wisconsin on sites with at least 24 inches of suitable native soil. Mounds are also currently used on replacement sites with less than 24 inches of suitable native soil An advantage of the mound design is that some part of the treatment zone can be elevated above the ground to compensate for site conditions with high groundwater or rocky soils. The new code will permit the use of mounds on any site with at least six inches of suitable native soil. The mound systems eliminate the need for holding tanks.

We recognize that the approval of new options may raise technical, administrative, and enforcement issues for some local governmental bodies. Throughout this winter, Commerce staff are conducting statewide training on the new Comm 83 and related issues. In addition, Mike Corry, Administrator of the Department's Division of Safety and Buildings, is available to brief local governments and other interested parties on the code and to answer questions. He can be reached at (608) 266-1816 or at 201 W. Washington Ave., Madison, WI 53701.

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Comparison of Performance:
Municipal and Onsite Wastewater Treatment Systems

Domestic wastewater must be treated and dispersed to the environment to protect public health and the quality of the waters of the state. There are essentially two categories of treatment options: municipal treatment plants and onsite sewage systems. Dispersal options for municipal plants are either discharge to surface waters or infiltration into the soil. State policy limits onsite systems to subsurface dispersal to soil.

Municipal plants are not required to disinfect treated effluent unless the effluent is discharged to a surface water that is a drinking water source or is a recreational water, and then only during the months of May to October for recreational waters.

Onsite systems typically rely on biological and physical processes in the septic tank and in the soil to achieve disinfection.

A qualitative comparison of fecal coliform concentrations typically found at the point of final effluent dispersal to the environment demonstrates the relative effectiveness of treatment by municipal and onsite systems.

	Municipal Plant without Disinfection[a]	**Municipal Plant with Disinfection[b]**	**Standard Mound[c]**	**Mound + Pretreatment[d]**
Fecal Coliforms	200,000-260,000 cfu per 100 ml effluent[g]	43[e] (4-3,000)[f] cfu per 100 ml effluent[g]	60 (<1-479) MPN per g dry soil[g]	2 (<1-34) MPN per g dry soil[g]

a C.-F. H. Ho *et al.* 1998. Evalauation of UV disinfection systems for large scale secondary effluent. *Water Environment Research* 70:1142-1150.
b Data submitted to Department by Milwaukee and Madison Metropolitan Sewage Districts.
c Data submitted to Department by James C. Converse, Dept. of Biological Systems Engineering, University of Wisconsin, 1998.
d J.C. Converse and E.J. Tyler. 1998. Soil treatment of aerobically treated domestic wastewater with emphasis on modified mounds. Pages 306-319 in *Onsite wastewater treatment: proceedings of the Eighth Annual National Symposium on Individual and Small Community Sewage Systems.* D.M. Sievers (ed.). St. Joseph, MI: American Society of Agricultural Engineers.
e average
f range
g cfu: colony forming units / 100 ml effluent, MPN: most probable number / gram dry soil
NOTE: These measurements are not direct quantitative comparisons.

Municipal plants without disinfection can discharge high concentrations (200-260 thousand fecal coliforms per 100 ml of effluent) of bacteria to surface waters. With disinfection, typically involving chlorination/dechlorination or ultraviolet light, final effluent from municipal plants can be expected to be on the order of 40-50 fecal coliforms per 100 ml of effluent. The standard for recreational waters is 200 fecal coliforms per 100 ml water and the effluent limit for municipal plants requiring disinfection is 400 fecal coliforms per 100 ml effluent.

Mounds are an example of onsite sewage systems. Studies on mounds in Wisconsin used to treat septic tank effluent were found to have an average of 60 fecal coliforms per gram of dry soil at 39 inches below the infiltrative surface. When used in combination with a pretreatment component such as a sand filter or an aerobic treatment unit, an average of 2 fecal coliforms per gram dry soil was found.

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There is no question that onsite sewage systems are as safe, or even safer, than municipal treatment plants as options for treating domestic wastewater in Wisconsin. The use of properly sited and installed onsite sewage systems certainly has benefits for the protection of surface waters when compared to non-disinfected municipal plants. In addition, onsite systems recycle groundwater onsite and help to maintain local groundwater reserve and baseflow to stream, unlike municipal plants which often take groundwater and shunt it into distant surface waters, out of the local hydrological system.

Wastewater Treatment Options for Small Communities

Nearly $50,000 per home to treat domestic wastewater?! That was the estimate an unincorporated community of Helenville in Wisconsin was given in 1996 to replace their failing onsite sewage systems with a centralized treatment plant. After public outcry, and the election of new district commissioners, the community is again considering its options.

Options should not be limited to onsite versus centralized systems. The Department of Commerce is proposing new regulations (Comm 83) for onsite sewage systems that will facilitate the use of cluster systems. These are wastewater collection and treatment systems that serve two or more dwellings. Each dwelling would likely have its own septic tank, but a distribution network would carry the wastewater to an off-site drainfield. Unlike the current code which requires municipal ownership of these systems, the proposed code would allow cluster systems to be owned by private entities.

Cluster systems are good for areas with highly variable soils. Lots with poor soils can be utilized by distributing the wastewater to drainfields in other nearby areas with better soils. They are also attractive options for areas with hilly terrain, extremely flat terrain, shallow bedrock, or a high water table. Typical treatment units for cluster systems would consist of septic tanks, sand filters, or aerobic treatment units (ATUs) that discharge their final effluent to an appropriate soil absorption field where it undergoes further "polishing". Collection networks are built of plastic pipe, so they can be routed around ponds, lakes, trees, and other obstacles. This can minimize environmental disruption as well as save money. Cluster systems provide greater design flexibility since they are less limited by the topography and soil conditions of a site.

Cluster systems can provide a cost-effective and long-term solution for less densely populated areas, in part because they save on the cost of extensive collection systems. A 1997 Environmental Protection Agency (EPA) study illustrates the cost comparisons between the different treatment options for a fringe community of 450 people living in 135 homes. All costs are on a per household basis in 1995 dollars, all options are assumed to have a 30-year life span, and the centralized system assumes 1 home per acre.

Treatment Option	Total Capital Cost	Annual Operating and Maintenance Cost	Total Annual Cost
Centralized system	$17,200	$220	$1606
Cluster system	$4,430	$54	$411
Onsite system	$3,777	$99	$403

As with any wastewater treatment system, cluster systems require an ongoing program of maintenance to ensure long-term service and protection of environmental quality. The proposed Comm 83 requires maintenance plans and maintenance reporting; and it removes the requirement that systems serving multiple homes must be municipally owned. These changes should stimulate the market for management entities, and provide flexibility for creation of different types of management entities.

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Manage to Improve Maintenance of Onsite Sewage Systems

Flush and forget! No way! Maintenance is as important for onsite sewage systems as it is for municipal sewage treatment plants; as important in individual households as it is for other household utilities such as the furnace, water softener or car.

Maintenance of onsite sewage systems, however, is not onerous. A homeowner need only arrange to have the tank pumped at required intervals or the pump serviced and/or the filter changed if the system has them; there is nothing unusual to homeowners about periodic maintenance of their property.

But maintenance doesn't always happen. Most onsite sewage systems are below ground, so unless they do something obvious and obnoxious like backing up into the house, they tend to be out of sight, out of mind. They could be functioning less than optimally without the homeowner's knowledge. If they are not working as designed, there is a possibility that they could be contaminating groundwater.

The proposed Comm 83 onsite sewage system regulations take a big step toward ensuring that maintenance doesn't get ignored. For new systems, homeowners will be required to have an approved management plan, which details the inspection and maintenance requirements of the system, in order to receive a sanitary permit. For existing systems, the proposed regulations either specify the requirements, or refer to requirements specified by the manufacturer or designer of the component. Maintenance events will be reported by the service provider directly to the Department or designated agents of the Department, and records kept for not less than six years.

The new requirements for maintenance of onsite sewage systems are not appreciably different than those in the current code. What is new is the requirement that maintenance events be reported; and the addition of an incentive to see that maintenance is carried out. For the latter, if the required maintenance is not carried out, the onsite sewage system can be declared a human health hazard and the weight of rules to alleviate human health hazards can be brought to bear on the owner.

One effect of this requirement for management of onsite sewage systems should be stimulation of innovation in ways to organize and provide management. Credentialled service providers will undoubtedly be quick to seize opportunities to provide the required service in a manner most conducive to pleasing customers, that is, the homeowners. The proposed rules establish a mechanical POWTS provider credential.

As the Environmental Protection Agency pointed out in 1998, "*Managed* decentralized wastewater systems are viable, long-term alternatives to centralized wastewater facilities where cost-effective, particularly in small and rural communities (emphasis added)." The proposed Comm 83 directs much more attention to management than the current code.

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