Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

Matthew H. Mead, Governor

Todd Parfitt, Director

MEMORANDUM

TO: Dr. David Bagley, Chairman, Environmental Quality Council

FROM: Kevin Frederick, Administrator, Wyoming Department of Environmental Quality, Water Quality Division KF

SUBJECT: Supplemental Information Regarding Revision of Water Quality Rules and Regulations Chapter 25, Septic Tanks, Soil Absorption Systems, and Other Small Wastewater Systems

DATE: May 5, 2015

The Water and Waste Advisory Board (Board) discussed the proposed rule changes to Water Quality Rules and Regulations Chapter 25, Septic Tanks, Soil Absorption Systems, and Other Small Wastewater Systems, at meetings on June 14, 2013, September 19, 2013, December 5, 2013, April 18, 2014, and July 25, 2014. On July 25, 2014, the Board recommended that the Water Quality Division (division) proceed with the proposed changes, but requested that the public record note areas of the chapter in which there was not unanimous agreement:

Condensed Description	**Section**
Sidewall inclusion in calculations for soil absorption system sizing	Section 7(a)(i-ii)
Minimum diameter of access opening	Section 9(a)(vi)(A)
Minimum trench spacing	Section 11(a)(vi)(F)
Separation distance to groundwater	Section 13(a)(i)
Greywater	Section 16
Percolation Test Procedure	Appendix A

The Board also requested that the Water Quality Division prepare a memorandum to the EQC as part of the forwarded rule package to inform the EQC members of the contentious issues pertinent to consideration of the rule package. A summary of each of these issues, together with the division's response follows:

Sidewall inclusion in calculations for soil absorption system sizing, Section 7(a)((i-ii)

Board Member Cahn noted her disagreement with the decision to continue to allow inclusion of the sidewall for sizing purposes. Ms. Cahn expressed that she would prefer the calculations eliminate the sidewall inclusion. She cited the U.S. Environmental Protection Agency's (EPA's) *Onsite Wastewater Treatment Systems Manual* which recommends that including the sidewall area as an active infiltration surface in design should be avoided.

As Ms. Cahn noted, EPA's *Onsite Wastewater Treatment Systems Manual* does mention avoidance of sidewall infiltration in section 4.4.5, page 4-10: "Loss of the bottom surface for infiltration will cause the ponding depth to increase over time as the sidewall also clogs... If allowed to continue, hydraulic failure of the system is probable. Therefore, including sidewall area as an active infiltration surface in design should be avoided."

The *Onsite Wastewater Treatment Systems Manual* acknowledges that the sidewall is part of the infiltrative surface area by the statement that "over time the sidewall also clogs". Just as the bottom area clogs over time through the treatment of wastewater and the formation of a bio-mat, the sidewall clogs because it is also treating wastewater. By ignoring the sidewall area as part of the infiltrative surface area, the *Onsite Wastewater Treatment Systems Manual* requires more trenches or longer trenches for a required square footage of infiltrative area. The sidewall area then becomes a margin of safety, additional infiltrative area, which equates to more years of operation before possible failure. The division includes the sidewall as part of infiltrative surface area but adds a margin of safety through the use of larger wastewater flows in calculating the required infiltrative surface area. Both methods of calculating the infiltrative surface area result in a similar margin of safety. The division has included the sidewall area in calculating the infiltrative surface area for many decades. The low failure rate of small wastewater systems in Wyoming, also noted in the *Onsite Wastewater Treatment Systems Manual*, supports our position that our margin of safety is adequate and that our design approach doesn't result in premature failure of the absorption field.

Minimum diameter of access opening, Section 9(a)(vi)(A)

Board Member Cahn noted her disagreement with the division's decision to continue to allow the minimum diameter of the access opening, required for each compartment for inspection and cleaning, to remain at 20 inches. As the representative of the public at large, Ms. Cahn was contacted by a member of the public who was interested in seeing the minimum diameter change from 20 inches to 24 inches. The interested party, who has serviced systems professionally for many years, expressed preference for the larger opening, for grease interceptors and pump tanks, due to his company's business practice of instructing staff to enter the tank through the access opening during cleaning/inspection activities.

The division reworded the passage but did not change the minimum diameter of the access. Research of requirements for tank openings in neighboring states indicated the minimum tank access requirements ranged from 12 to 24 inches. Colorado, Utah, Montana, and South Dakota all require tanks to have openings of at least 20 to 21 inches. Nebraska allows for tank openings as narrow as 12 inches. Washington allows for 18 to 20 inches and Oregon allows for 24 inch openings as a minimum. At the national level, EPA's *Onsite Wastewater Treatment Systems Manual* specifies a range of 18 to 24 inches.

Further research of dosing tank openings from the division's approved septic tank list revealed that: 33 of 60 tanks demonstrated a tank opening of 20 inches in their design specifications; 25 tanks out of the 60 demonstrated tank openings of 24 inches; and two tank designs specified openings of 22 or 22.5 inches.

Not all operators physically enter tanks for tank maintenance. EPA's *Onsite Wastewater Treatment Systems Manual* warns (page 44) that "in performing inspections or other maintenance, the tank should not be entered. The septic tank is a confined space and entering can be extremely hazardous because of toxic gases and/or insufficient oxygen."

The division believes that maintaining the 20 inch diameter access opening, in the middle of the recommended size range, allows for variety of tank maintenance activities but discourages human entrance. All of the tanks installed this year meet this minimum standard. Therefore, this requirement would have no, or minimal economic impact on the tank manufacturers. Delegated counties may adopt requirements that are more stringent than the minimum standards. The proposed access opening is a minimum; larger access openings would still be in compliance with the rule.

Minimum trench spacing, Section 11(a)(vi)(F)

Board Member Cahn noted that she disagreed with the three feet minimum spacing between leachfield trenches and would prefer that the minimum spacing increase to four feet. Ms. Cahn noted that the states of Colorado, Utah, and Montana require spacing of four to six feet.

The Wyoming requirement for spacing between trenches currently states "A minimum separation of three feet or a horizontal distance equal to 1.25 times the vertical depth of the trenches, whichever is greater, of undisturbed soil shall be maintained between adjacent trench sidewalls." In its proposed revision the division has retained the minimum spacing of three feet but added a condition for increasing to nine feet of separation if the area between trenches is planned for reserve, or replacement area. Additionally, clay loam soils with low percolation rates greater than 60 min/in are required to maintain nine feet between trenches. This additional separation for clay loam soils with low percolation rates will not be considered as reserve.

The 2002 *Onsite Wastewater Treatment Systems Manual* does not specify a recommended distance between trenches. The 2002 manual states that the spacing is "determined by the soil characteristics and the method of construction." The 2002 manual goes on to explain (page 4-17), that "given the advantages of lightweight gravelless systems in terms of potentially reduced damage to the site's hydraulic capacity, parallel trenches may physically be placed closer together, but the downslope hydraulic capacity of the site and the natural oxygen diffusion capacity of the soil cannot be exceeded."

The 1980 *Onsite Wastewater Treatment and Disposal Systems* manual was more specific. This version of the manual would have been the most current at the time the original Wyoming regulation was written. The 1980 manual states (page 221), "spacing between trench sidewalls could be as little as 18 in. A spacing of 6 feet is suggested, however to facilitate construction and to provide a reserve area between trenches." The 1980 manual goes on to state "trench spacing may be decreased because of soil flow net patterns, specifically for shallow trenches in sandy soils."

Our regulations specify that the minimum spacing between trenches is three feet if there is no reserve area for a replacement absorption field. It is not clear in the regulations for Colorado, Utah or Montana if the 6 foot minimum spacing includes space for a reserve absorption field or not.

Separation distance to groundwater, Section 13(a)(i)

At the July 25, 2014 meeting, Casper/Natrona County Health Department representative John Drinnon expressed concern for the proposed requirement that mound systems achieve a minimum separation of one foot of vertical separation between the bottom of the sand fill and the seasonally high groundwater level. Mr. Drinnon explained he believes the minimum should be two feet to accommodate slow percolating soils. Board Member Cahn expressed concern after the division's explanation to Mr. Drinnon.

The one foot separation required in Section 13(a)(i) is not the only layer of separation between the surface and the groundwater level. Section 13(a)(i) would require that a minimum of one foot, of the four feet of total separation as proposed in Section 6(d) of the chapter, shall be native soil. The other three feet of separation will come from the mound structure. Additionally, fast percolating soils outside of the range beginning at 5 minutes per inch (mpi) would require the expertise of a professional engineer, as proposed in Section 2. Furthermore, the division is preparing a design package which incorporates the general requirements of sand mound systems. The design package will be available on the division's website and will assist homeowners in preparing an application.

The division is satisfied with the regulation as written. The previous iteration of Chapter 25 did not propose a minimum separation of the native soil from the high groundwater level. With proper design and installation of the mound system in accordance with the proposed regulation, the division believes that groundwater will be protected.

Greywater, Section 16

Ms. Cahn feels the proposed regulations will discourage reuse of greywater.

The division carefully considered Ms. Cahn's concerns about the greywater section. The division has worked to ensure that Section 16, Greywater Systems, is consistent with our current water reuse standards in order that we adequately protect human health.

The division's water reuse standards, applicable to "any person who prepares or applies treated wastewater from domestic sewage", are currently located in Chapter 21, Standards for the Reuse of Treated Wastewater, and outline three classes of wastewater treatment. Class A would require removal of fecal coliform down to 2.2 /100 mL and would apply to land having a high potential for public exposure and irrigation of direct human consumption food crops. Class B would require the equivalent of secondary treatment and disinfection of fecal coliform to 200/100 mL for irrigation of lands having a moderate public exposure potential and direct human consumption food crops. Class C would require disinfection of fecal coliform to 1000/100 mL for irrigation of lands having low public exposure potential and indirect human food crop consumption. While the total coliform concentration in greywater is less than is typically found in domestic blackwater, the concentration levels are still potentially harmful when humans are exposed to it.

At the December 5, 2013 Water and Waste Advisory Board meeting the division presented a handout titled *Critical Review: Regulatory Incentives and Impediments for Onsite*

Graywater Reuse in the United States. The figures in Table 1 of this handout demonstrate that the total coliform for mixed greywater can range from $5.6x10^5$ to 1×10^8 CFU/100-mL for systems generating 127-151 L/capita-day. The division considered these figures while drafting the proposed greywater regulations and came to the conclusion that the most reasonable, but protective, approach would be to propose to regulate greywater similar to the way the division currently regulates Class B wastewater reuse.

The division believes that regulating greywater similarly to the current Class B wastewater regulations is a flexible approach. Homeowners may choose a system to fit their needs, but they must operate it in a way that is protective of human health. Just as the water reuse standards in Chapter 21 require additional treatment and setback distances as the potential increases for human exposure, the proposed rule also requires additional measures for systems with increased risk of human exposure. For instance, the proposed greywater regulations require a 30 foot setback for surface irrigation, such as flood irrigation, and do not require setbacks for subsurface irrigation, such as drip systems. The proposed greywater regulations require disinfection for surface irrigation; however, the proposed regulations do not require disinfection for subsurface irrigation. States such as Montana, Idaho, and Utah prohibit surface irrigation use, with or without disinfection.

While the idea of "disinfection" of surface irrigation greywater systems may initially seem complicated or discouraging, we are confident that our future efforts to educate the public will demonstrate that, for surface irrigation systems, disinfection is a safety measure that can be low cost and low maintenance. Common methods of disinfection include household chlorine bleach, which ranges in price from $1 to $3, and commonly found pool chlorine or bromine dispensers, ranging from $5 for a basic floating dispenser to $100 for more complicated models. Additionally, homeowners may choose UV disinfection as a treatment method, although UV systems are considerably more expensive ($300-$1500).

Although Ms. Cahn believes the regulations are burdensome, the division believes that the proposed greywater regulations fulfill a number of directives. The greywater design standards are consistent with existing division rules and regulations (Chapter 21). The greywater regulations allow homeowners the freedom to safely design and install the system of their choosing. The greywater regulations enable the state to adequately enforce standards which are protective and prevent pollution.

Percolation Test Procedure, Appendix A

Board Member Cahn noted her disagreement with the proposed changes to the proposed percolation test procedure. Ms. Cahn is concerned that requiring testers to fill the test hole with eighteen inches of water and observe the water level drop to six inches, instead of filling the hole to twelve inches and observing the drop to 1 inch as required by the traditional method, will result in erroneous percolation rates and improper sizing of leachfields.

The division evaluated the traditional percolation test method and proposed changes that maintain accuracy, but which are easier for homeowners to use the test method. We believe the proposed method (Appendix A) is more practical. Three test holes are required under both methods. Under the traditional method, each hole must be tested one at a time. However the

proposed method allows testing of all three holes simultaneously. The measurements are easier to apply under the proposed method—instead of guessing when to take a measurement, the new procedure directs measurements every ten minutes.

Ms. Cahn's concern is valid--the percolation rate determined under the proposed method is faster. However, when incorporating the slightly faster rates with the other additional factors required to determine the appropriate size of a system, Wyoming's proposed percolation test method does not significantly alter the end size. The division is confident that the proposed method will contribute to accurately sized systems.

In conclusion, the division believes that the issues raised have been carefully considered and adequately addressed. The division respectfully requests that the Council consider the proposed chapter for approval.

KF/gjt/15-0358

cc: Jim Ruby, Executive Director, EQC
Todd Parfitt, Director, DEQ
Water and Waste Advisory Board