Drainfield to Surface Water Setback Distance Subcommittee
Teleconference Meeting Minutes
Wednesday, 03/31/2010, 10:00 am

Teleconference
Date: 2010-03-31
Start: 1000 hours

Attendance: Boise: AJ Maupin, PE; Bill Holder, PE; Joe Canning, PE
Hayden: Dick Martindale
Post Falls: Allen Worst
Athol: George Miles, PE
Kimberley: Dr. Jim Ippolito, Ph.D. USDA
Missing: John Corcoran (Realtor Association Representative); Brett Skidmore (Building Contractors Association Representative); Nathan Taylor

Meeting called to order at 10:04 am.

Past Meeting minutes:

March 3, 2010 Minutes: Prior meeting minutes presented. Motion made to approve the minutes as presented, the motion was seconded and the minutes passed.

Vadose Zone modeling:

Jim provided a new spreadsheet approach to determining a site's ability to sequester phosphorus. The use of the PHREEQC thermodynamic modeling program was proving difficult. PHREEQC kept precipitating the aluminum and iron out. This new spreadsheet calculates the mass of soil beneath the drainfield, taking into account the volume between trenches, down to the aquifer or an inhibiting layer. The current presentation used a uniform 4 foot depth beneath the drainfield. The soils selected had data available on their aluminum and iron concentrations. This first pass model applied two phosphorus concentrations to the drainfield, 3 mg-P/L and 20 mg-P/L. Finally, 6 different soil types were evaluated and a 'best case lifetime' was calculated for the soils. The 'best case lifetime' identified how long it would take to consume all of the soils available aluminum and iron. This equates to the ultimate capacity for phosphorus sorption in the soil volume beneath the drainfield. The soils selected spanned the state and included:

- Logan, a calcareous, silty soil of south eastern Idaho
- Declo, a calcareous, loamy soil of south central Idaho
- Greenleaf, a calcareous, silty soil of western and south western Idaho
- Palouse, a non-calcareous, silty soil of northern Idaho
- Santa, a non-calcareous, silty soil of northern Idaho
- Threebear, a non-calcareous, loamy soil of northern Idaho

During discussions of this model it was pointed out that the soils will most likely experience phosphorus breakthrough at some point prior to reaching the ultimate sorption capacity of the soil. A definition of breakthrough was presented; breakthrough occurs when the phosphorus concentration leaving the soil volume equals 50% of the input concentration. Additionally, it was proposed to limit the analysis to just one concentration, 9 mg-P/L, for the effluent being pressure dosed to the drainfield. Jim indicated he would rerun his models with these changes and return with new "lifetime" calculations.

The limitations of this spreadsheet model won't allow it to identify when phosphorus will start leaking through the soil. Jim will investigate whether he can get the PHREEQC program to work better. It was proposed that the saturated flow modeling begin with a phosphorus concentration of 4.5 mg-P/L (50% of 9 mg-P/L input to drainfield).

Saturated Flow Modeling:

We looked again at the curves from the previous meeting. These curves showed the concentrations of a small stream after 20 years of drainfield flows. The stream receiving flows from the soil with the lowest hydraulic conductivity had still not reached equilibrium. Bill mentioned that he knew how to model a flowing stream, using 25% of the flow for dilution, but not lakes and reservoirs. AJ mentioned that DEQ provides the following guidance for modeling discharges to lakes and reservoirs.

The surface area of the lake is obtained. 10% of that surface area is taken and spread along the shoreline, thus identifying a distance out from the shoreline. The section of shoreline along the development is then investigated.

An average depth at this distance out from the shoreline is estimated and this volume of water is used in the dilution calculations.

A question was presented about whether the domestic wastewater flow data, collected by the Health Districts in support of the 2009 negotiated rulemaking, was pertinent to this evaluation. These data are still valid but not eligible for use here. They may be useful for sizing drainfields during permitting but only after they become Rule. Another question was posed whether the 90th percentile flows would be used for nutrient – pathogen analyses. AJ indicated that these studies, including the phosphorus impact to adjacent surface waters, should model large developments and extended lengths of time. Average flows and constituent concentrations are most appropriate for this type of modeling because the peak flows and concentrations average out over the period modeled. Any change in domestic wastewater flows that may occur in the future will most likely only be applicable to drainfield sizing to provide a drainfield capable of holding peak flows without backing up into the tank and home.

Bill indicated he would alter the values in his model and present the new results at next meeting.

Miscellaneous:

Various concerns and questions were voiced. How will the 1 foot separation distance to seasonally high ground water be addressed? What are the long term effects of varying ground water depth on the soil's phosphorus sequestering ability? Will this phosphorus modeling only apply to large developments or individual homes? How will cooped soil phosphorus sequestering ability be addressed?

Will this subcommittee make a recommendation to the Technical Guidance Committee (TGC) and is that the correct course of action in light of the recent events occurring during the 2010 legislature? It was mentioned that a recommendation will be made to the TGC and it is up to the TGC to determine its own course of action. Any recommendation that includes modifying distances or other values that appear in Rule should be addressed by changing the Rules through negotiated rule making.

Allen recommended that we revisit the variables that may influence the modeling and permitting. AJ indicated he would distribute a spreadsheet with the variables the subcommittee discussed in the past, with additional columns for suggested maximum, minimum and typical values. The subcommittee members are requested to fill in any missing variables and propose values for the variables. Return the spreadsheets quickly so that the can be combined and provided to Bill who will do a sensitivity analysis. The values for the variables do not have to be accurate. A sensitivity analysis will indicate how significant a variable is to the modeling.

Next Meeting Schedule:

The next meeting is scheduled for Wednesday, 21 April 2010, from 10:00 am MST (9:00 am PST) to 12:00 pm MST (11:00 am PST).

Meeting Topic:

Discuss the vadose zone modeling modifications proposed in this meeting. Discuss the impact of changing the input to the saturated flow modeling to 4.5 mg-P/L. Discuss variables and their impact on modeling. Bill Holder to perform a sensitivity analysis.

Meeting adjourned at 12:01 pm.