Drainfield to Surface Water Setback Distance Subcommittee
Teleconference Meeting Minutes
Wednesday, 02/11/2010, 10:00 am

Teleconference
Date: 2010-02-11
Start: 1000 hours

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

Meeting called to order at 10:00 am.

Past Meeting minutes:

January 27, 2010 Minutes: Joe Canning commented that it was not uncommon for some Idaho Health Districts to routinely issue installation permits allowing drainfields to be placed as close as 100 feet from surface water. Motion was made to accept the 27 January 2010 meeting minutes as amended, seconded and passed unanimously.

AJ indicated that the 1978 Rules (Section 1-3013.05 (b)) required that a variance be granted in order for drainfields to be placed closer than 300 feet from surface water. Additionally, the next note in the 1978 Rules (Section 1-3013.05 (c)) states that "Greater distances may be required by local code. (2-7-79)".

Joe Canning reminded us that in prior meeting(s) he indicated that when this subcommittee looks at the "Type" of surface water adjacent to potential drainfield locations, that we should carefully consider whether the surface water is classified as temporary (*exists continuously on the surface for less than 2 months*)*, intermittent (*continuously present on the surface for more than 2 months*)* or permanent (*continuously present on the surface for more than 6 months*)*.

Discuss available phosphorus data

Availability of national phosphorus data sets was discussed briefly. AJ indicated that he was unsuccessful in obtaining these data. The Idaho data, currently being collected under a American Recovery and Reinvestment Act (ARRA) of 2009 financed project, is starting to arrive. A very preliminary report on the range of phosphorus concentrations (total phosphorus reported in mg-P/L) indicates that the data range from 4 to 20 mg-P/L. This project's activities, objectives and participants, were presented. This ARRA project's activities include sampling of domestic septic tank effluent for analysis of both Soluble Reactive Phosphorus (SRP), and Total Phosphorus (TP). SRP samples are actually filtered through 0.45 µm filters and represents the phosphate concentration in the effluent. TP is unfiltered and represents both the soluble and particulate phosphorus in the effluent. The project's objective is to identify statistically valid phosphorus and phosphate concentrations in septic tank effluent that is discharged to the environment at the drainfields. This will be the phosphorus concentration that will be used in modeling efforts for standard systems (onsite systems consisting of septic tanks only). Only 6 of Idaho's 7 Public Health Districts chose to participate in the project. North Central District Health (NCDH) choose not to participate due to the limited number of available qualifying sites, distance between qualifying sites and personnel limitations.

It was pointed out that the ARRA project data collection schedule would not support the preliminary milestone, discussed during the 2 December 2009 meeting, for making recommendations to the TGC. That fact was noted. It was noted that for preliminary modeling efforts the phosphorus values reported in the US EPA's Onsite Wastewater Treatment Systems Manual, Table 3-7, could be used. Dick pointed out that the values listed in Table 3-7 are for raw domestic wastewater (*verified*). It was proposed that these values in Table 3-7 could be used for the initial modeling efforts and input values refined as results from the ARRA funded project are solidified.

A question was raised concerning secondary wastewater treatment technologies and their applicability to reducing phosphorus discharged to the environment (drainfield). It was mentioned that in the past a manufacturer tried to obtain a phosphorus reduction credit for their technology. That effort, while unsuccessful, happened to correspond with the TGC's recommendation that the Constituents and Mass Loading table in the TGM (Table 3-1) be replaced with the previously mentioned US EPA Table 3-7. This action changed the TP value used in the Nutrient-Pathogen

*: parenthetical information provided for clarification

(N-P) Study from 12 mg-P/L to 9 mg-P/L, effectively granting the system manufacturer and their developer/client the phosphorus reduction they were looking for.

Modeling:

A set of questions were presented concerning how modeling should be addressed. Should we estimate the influent concentrations and weighting? Can we use existing models and tweak them to fit?

Bill mentioned that he could use a Dominico model for saturated flow conditions. The model would address dilution and dispersion in the ground water. This model would need the resulting constituent concentrations after the vadose zone unsaturated flow sorbs phosphorus from the septic tank effluent. This would be the output from the unsaturated flow model that Jim would provide. Modeling in the unsaturated zone can be accomplished with an add-on module to MODFLO, but there is no money to cover this expense.

Jim mentioned that he has not used hydraulic modeling software packages, like Hydrus 2D (*a software package for simulating water, heat, and solute movement in two-dimensional variably saturated media*)*. His expertise is in thermodynamics. He has experience using Visual Minteq and PHREEQC (USGS) software packages. The inputs required should be in concentrations measured in parts per million (ppm). The ARRA study will be reporting the phosphorus concentrations in milligrams (mg) per liter (L) where the mg is phosphorus (mg-P/L), not phosphate. Soil attributes that must be identified for vadose zone modeling can be obtained from soil analysis and include the concentrations of aluminum (Al), iron (Fe) and calcium (Ca) and the mineral phases present. Sensitivity analyses can also be performed with some additional effort.

A question was presented about whether clay would sorb phosphorus and whether it could be modeled. The response returned the focus to the metals previously presented, indicating that they would provide the main sites for phosphorus retention in the soil. Soil tests for these metals were discussed and determined that if the mineralogy were determined without identifying the amorphous states, costs could be kept under control and the model would be conservative. An estimation of the laboratory expense for the three metal analysis was presented at about $10 per metal.

The concern that Ca releases its sorbed phosphorus if the pH of the solution becomes acidic (low pH) was voiced. It was confirmed that this is true, but the soils in southern Idaho are very high alkalinity (high pH) and resist pH changes due to this buffering capacity. Eventually the soils will take on the characteristics of the effluent being discharged. This may be addressed by allowing the soils to rest, which returns some of the soils phosphorus sorption capacity. Northern Idaho soils will have to be investigated to determine whether they also are calcareous.

Use of current setbacks during the initial modeling efforts will be the starting point. Inputs to the drainfield will be refined as the ARRA funded septic tank study progresses. Until these values are defined the US EPA range of values from Table 3-7 (6 mg-P/L to 12 mg-P/L) should be used for phosphorus inputs to the vadose zone modeling. Results from the vadose zone modeling will be used as inputs into the saturated flow model eventually, but until these values are defined a range of TP values, from 1 mg-P/L to 9 mg-P/L, will be used. Allowable surface water phosphorus concentrations will be investigated and distributed to the subcommittee members, and early enough for the initial modeling efforts.

A suggestion was made that this modeling could be documented as a procedure that permit applicants could pursue if their site configuration forces them into placing the drainfield closer to surface water than the current Rule allows. The applicant could use this procedure to determine the site phosphorus sequestering ability and identify a reduction in the surface water setback distance that would still be protective of the State's resource. This might not require a Rule change, and if documented in the TGM could be permitable due to it meeting the intent of the Rule. In conjunction with this site evaluation procedure phosphorus removal technology's contribution should also be accounted for. If suitable technologies are identified, further reductions to surface water may be allowable.

Technology:

It had been discussed in past meetings to employ drip distribution to maximize the phosphorus uptake by plants. Proper designed drip fields could be used to allow one to rest, and recuperate some phosphorus adsorption capacity, while the second drip field is being used. One shortcoming with this is that the phosphorus is incorporated into the plant/grass and may not be removed if the owner mulches their grass.

A brochure on PhosRock, calcium silicate, had been distributed previously. Jim commented that calcium silicate could dissolve/dissociate in wastewater providing calcium to bind with available phosphate. It was noted that the

*: parenthetical information provided for clarification

PhosRock brochure reported a wide efficacy and that this technology had yet to be approved by any State. Allen mentioned that he has a doctoral dissertation addressing this technology that he will forward to the group. Additionally, he has been in touch with Greentech, a company that markets this technology, and they have offered to supply PhosRock for a test system. Allen indicated that RC Worst could provide the personnel to perform these tests. AJ indicated that a Quality Assurance Project Plan (QAPP) should be generated and approved prior to any test execution to assure the proper procedures are identified and followed, securing the quality of the data and providing statistically significant results.

Nathan introduced a competing technology provided by Lombardo & Associates called PhosRID (*Phosphorus Reductive Iron Dissolution*)*. Literature indicates that PhosRID can reduce phosphorus by 90% to 95%, and the media has life expectancy of 7 to 10 years. This technology requires an aerobic environment to precipitate the amorphous ferric compounds which sequester the phosphate. It was pointed out that it would be almost impossible to get system owners to replace their media at the media's end of life under Idaho's current permitting structure. This would be more easily accomplished with an Operating Permit than our current Installation Permit structure.

Another technology called Phosphex was presented. This technology is affiliated with the University of Waterloo, Waterloo, Ontario, Canada. More information will be obtained and distributed prior to next meeting.

Blue PRO phosphorus removal technology by Blue Water Technology, Inc. was asked about. Information was provided about the company's current backlog of work and their unwillingness to look at system of less than 10,000 GPD. Blue PRO was described as an iron coated sand media that can be backwashed to remove the iron-phosphate mineral and expose new iron sorbtion sites.

Milestones:

The comment was made that the first milestone listed in the December 2, 2009 milestones is no longer applicable. This milestone, 'Existing Setback Applicability' with a due date of 26 February 2010, was discussed in previous meetings. To recap, the current Idaho setbacks were arrived at through political negotiations without any scientific documented justification. Furthermore, canvassing other states failed to identify similar scientific data support surface water setback distances in Rule/Regulation. This milestone will be struck.

The next milestone is 'Constituent of Concern (COC) Impacts' and has a completion date of 2 April 2010. It was pointed out that COCs were addressed (*pathogens, nitrogen, phosphorus & PPCP/EDCs*)* and only phosphorus was deemed pertinent due to (1) nitrogen reducing technologies and modeling already established in the program and TGM, (2) pathogens suitably negated via unsaturated flow through an appropriate length soil and (3) PPCPs/EDCs too new and broad a topic to address at this time. The COC identification is complete (*phosphorus*)*, but it was recommended that this milestone be broken into two, one for COC identification (complete) and the other for COC Impacts. The COC Impacts should be added with the same due date (2 April 2010).

Dick expressed his continued concern with nitrogen. He had come across reports from a Canadian experimental station that indicated when nitrogen was reduced at this site's experimental lakes, algal blooms continued due to remaining soluble phosphorus. AJ indicated that he had also come across this Canadian experimental station's reports. It was pointed out that when soluble nitrogen was reduced it was no longer available for the native bacteria, but that does not limit the blue-green algae (cyanobacteria), which is nitrogen fixing and draws its nitrogen directly from the atmosphere. Dick agreed to drop nitrogen form the COCs.

Next Meeting Schedule:

The next meeting is tentatively scheduled for Wednesday, 3 March 2010, from 10:00 am MST (9:00 am PST) to 12:00 pm MST (11:00 am PST).

Meeting Topic:

Discuss preliminary modeling efforts.

Meeting adjourned at 12:01 pm.

*: parenthetical information provided for clarification