Remarks to the OSS WAC 246-272A

1. Table VI "Treatment Component Performance Levels and Methods of Distribution" of the OSS Code gives the most important technical features of the wastewater treatment technologies, namely: applicability.

This is the most wrongful approach in the entire regulation of waste water treatment. It disregards absorption properties of the OSS drain-field and introduces so called “vertical separation”, assuming that the depth of soil restrictive layer defines absorption properly.

Such approach may work in the places with low and moderate rainfall, but not in the Western WA. No matter what the “vertical separation”, or the level of restrictive layer below the ground surface is, winter rainfalls saturate flat soils with water within two-four weeks of November depending on the “vertical separation”, bringing the winter water table to 2”-4” below the surface. Sometimes during heavy rainfalls rainwater doesn’t have time to drain or evaporate and stands on the surface. Any Washingtonian, who lives on the flat grounds with silty clay soils with restrictive layers at about 3-4 feet below the surface, which are abundant in WA, knows it very well.

There is no such water table levels mentioned in the Table VI.

A good solution for this problem is active drainage of the rainwater at close proximity of the OSS drain field, giving enough space for filtration. The other very good solution is use of ATUs (Aerated Treatment Units) in such places. First approach increases efficacy of filtration of effluent discharged from the sewage tank. The second gives an ability to purify water in the tank to the level, which does not need remarkable filtration.

To correct this evident mistake **Table VI must be replaced with requirements to absorption and filtration properties of the OSS drain-field during winter months in WA.** These two features totally define efficacy of the OSS drain-field and have such important feature as measurable parameters. Use of table VI instead is wrongful and may cause arbitrary judgments of local HD specialists and in critical cases pollution of surface waters.

Following table 6, local health departments require use of the mound shaped drain-fields with pressure distribution of effluent for the new OSSs. This design has less than two feet of effluent filtration layer above the ground. After that effluent can be mixed with waters, standing on the surface.

This question is also accompanied with wrongful requirement to the technology of construction of the OSS drainfield listed in the **WAC 246-272A-0010 Definitions. "Subsurface soil absorption system" (SSAS),** which requires use of drainrock around a distribution pipe.

It’s not clear how it happened that drainrock was introduced as a media in soil absorption system, but this requirement is unnatural and illogical. Drainrock never-ever was either a good filtration material or a good dwelling for aerobic bacteria, which are the major working force in the OSS drainfield. Even sand is not a very good dwelling for bacteria, if compared with organic matter. It means, that the proper surrounding for a drainpipe might be sawdust (excluding coniferous trees and eucalyptus), or straw and hay. Both enhance proliferation of aerobic bacteria and make drainfield very efficient. **Use of drainrock in the drain-field is wrong**.

2. The second most important remark is the approach to sewage tank design. The most important features of efficient WW treatment are:

A) Separation of black and gray waters from the house and streaming them either into separate tanks or into different compartments of the same tank and discharge into a separate drain-fields.

All designers of the sewage tanks know perfectly well that the major working force of every sewage tank are bacteria either aerobic or anaerobic, depending on the design. When black waters are mixed with gray waters, which usually contain chemicals that kill bacteria, the efficacy of the treatment process is totally disrupted, because all bacteria are killed. It can take several days after discharge of

water from a clothes-washer or a dish-washer to restore their population. If a dish-washer is used every day, the efficacy of the sewage tank is disrupted. It would be very wise to direct gray waters into different drain fields after treatment in different sewage tanks. This makes design of OSS slightly more complicated from the point of view of house wastewater system design but increases its efficacy many times, and hence, makes the system smaller and cheaper.

All solid organic wastes like toilet paper, cotton, food wastes and the likes should be prohibited to discharge into black-water treatment tank and must be treated separately, because, if they come into the same treatment compartment, solid wastes can clog it, since they require much longer time to degrade in the water of the tank. It's much wiser to treat these type of wastes in aerated composting containers, which allow much more efficient development of bacteria since does not limit rise of temperature.

From my personal experience I know that composting of solid organic wastes in an aerated composting container takes just from several days to several weeks, if they are cut into small pieces properly, versus many months in a sewage tank. It's the matter of first importance to design aerated composting containers for solid organic wastes, describe this design in the Code and ask Washingtonians to use such composting containers in their households.

This remark is very important because discharge of solid organic wastes into black-water treatment tank causes clogging and failures of OSSs.

B) Very bad mistake in the OSS Code is **complete absence of any mention of aerobic treatment process in the Code**.

Aerobic treatment of Waste Waters (WW) is used since its invention in 1921 and is studied very well and proved its efficacy. The resistance of ORRC and other stakeholders, responsible for OSS Code revision, to introduce this technology in the Code simply contradicts common sense. Everyone who ever studied biology in school and heard about Krebs-cycle (or citric acid cycle) knows that nature had chosen aerobic process as the most efficient for the overwhelming majority of living species. An aerated sewage tank populated with aerobic bacteria reduces Biological Oxygen Demand (BOD) in the black-water treatment tank within days into zero.

What one has as a result is 99% pure water discharged from the sedimentation compartment into the drain-field. And this powerful technology is completely disregarded in the OSS Code on the reason that there might be failures of the system, as if anaerobic systems, described in the Code, never fail. It's the duty of ORRC to elaborate guidelines and requirements to ATU design, which exclude failures, and this is very easy, if aerobic treatment process is used only for black-waters. It supposes that gray-waters with detergents and bleaches, which kill bacteria, and solid wastes, which clog the system, are directed away from the aerobic treatment tank. **The system cannot work, if the major working force is destroyed**.

The second advantage of ATUs over Septic Tanks is that Septic tanks generate methane and hydrogen sulfide. Methane is a very strong greenhouse gas, 20 times stronger than CO2. Besides methane is flammable, which also makes Septic Tanks unsafe. Aerobic bacteria in ATUs don't generate methane and hence don't require thorough isolation of the tank from the surrounding, making service easier and safer.

Aerated black-water tanks (treatment units) are smaller in size and achieve way better results in water recycling, if compared to anaerobic systems. "ATUs may enable development and use of sites with difficult soils. They can remedy existing malfunctioning systems and they can be a good option for homes in environmentally sensitive areas". Complete absence of any mention of aerobic treatment in the OSS Code is an administrative crime.

3. One of the most important questions of the legislation ruling OSS design and construction is an **article WAC 246-272A-0230**, which deprives the property owner of the right to develop the property in the way that the owner considers the most appropriate and economically efficient.

WA DOH is to develop the guidelines and requirements to the design and construction, but does not have a right to decide who must do the job, because it violates both American Constitution and Universal Declaration of Human Rights.

In this respect the article WAC 246-272A-0230 must read as follows:

WAC 246-272A-0230 Design requirements—General. (1) On-site sewage systems may ~~only~~ be designed or design may be approved by professional engineers, licensed under chapter 18.43 RCW or on-site sewage treatment system designers, licensed under chapter 18.210 RCW, except:

(a) ~~If at the discretion of the local health officer,~~ A~~a~~ resident owner of a single-family residence not ~~adjacent to~~ within two hundred feet of a marine shoreline is allowed to design a system for that residence, if the detailed system design, which the owner presents, meets the requirements under WAC 246-272A-0230, 246-272A-0232, 246-272A-0234, 246-272A-0238 and DS&G, and looks acceptable to the local health officer; or

This type of reading of the article restores the owner's rights and gives one a natural freedom of choice of how to develop the property in the most efficient and appropriate manner, ensuring safety of the environment, since all guidelines are fulfilled. And hence, brings the cost of the OSS construction down, making it more affordable. Affordability of the OSS construction increases the safety of the environment and prevents pollution.

It's not clear why the ORRC opposes this natural change stating that: " this change is too complicated and contentious to introduce at this point". This type of explanation of violation of human rights is neither reasonable no legal. It's not clear what complication this change involves and when such change might be considered timely, if it's "contentious at this point of time". It's evident that proper compliance of legislation with human rights is always timely.

4. **The fourth mistake** in the Code is introduction and intensive use of pseudo-scientific term "Undisturbed Soil" without describing any quantitative properties of this term.

Properties of soils are studied very well and described in many scientific publications. Physical and chemical properties of soils depend on composition of aggregates of soils:

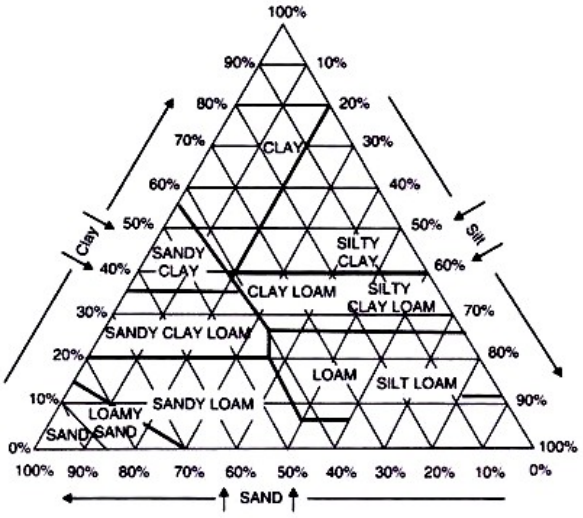

Fig. 23.2. Equilateral triangle used by USDA for textural classes of soil.

Besides, soil properties are influenced by content of moisture, organic matter, micro-organisms and root growth. **The term Undisturbed Soil does not describe any of these properties and thus cannot be used in the legislation, which rules construction of OSSs drain-fields in WA.** Use of this term in the Code causes arbitrary judgments of local health officers.

Table IV of the Code, which describes Minimum Horizontal Separations, is also full of arbitrary requirements not supported by definitions of properties of soil or any other scientific evidences. For example: design of nonpublic water well requires good seal of the well pipe and separation of ground waters from surface ones and thus it's not clear why 100ft horizontal separation is needed. Besides, the minimal requirement of water well depth is 20ft. Such layer of soil can filter any waters, even effluent coming from a Septic tank. It's evident that 100ft horizontal separation requirement is arbitrary.

What is expected for the results of the current revision of the OSS WAC 246-272A is that the Code is going to see some cosmetic changes with all wrongful articles remaining untouched.

But besides pseudo-scientific approach to OSS design regulation, legislation that rules Waste Water treatment in homesteads uses other methods of administrative violence, which contradict both Amendment 14 of American Constitution and article Article 17 of UDHR stating that (2) **No one shall be arbitrarily deprived of his property**.

Current OSS legislation in WA requires the property owner abandon his property and stay away from it until a Local Health Office (LOH) approves construction of OSS in the property. This request assumes that presence of the owner in his property pollutes the environment and is dangerous for the health of neighbors without presenting any clear evidence of such pollution, which might be dangerous for health of the owner and his neighbors.

The legislation does not require LOH to prove this statement with evidences of the pollution, and thus exposes the owner to arbitrary judgments of LOH officers.

It's evident that current OSS legislation requires serious revision and shall be remarkably amended to bring it in compliance with scientific approach and American Constitution, removing all articles with arbitrary requirements without measurable parameters.

George Danilov
Physicist.
11/15/20