Session 1
Septic Tank Drainfield Site Suitability and Evaluation Workshop
1-Introduction DEQ Septic.doc

Montana State University Extension Service, Department of Land Resources and Environmental Sciences, in cooperation with Montana Department of Environmental Quality

Power Point: **DEQ Septic Introduction.ppt**. This power point consists of 12 frames, the purpose of which are to establish the justification for and general focus of the septic tank drainfield site suitability and evaluation workshop.

Frame 1: Title, presenters.

Montana, along with most other Northern Plains and Intermountain states, has experienced significant population growth in the past decade. An integral part of that population growth has been residential housing construction – which necessitates a need for provisions for domestic waste water management.

Subdivisions and individual residences without direct connections to municipal wastewater treatment facilities rely on on-site waste management and disposal, almost entirely in the form of septic tanks and integral drain fields. Although the technology of septic systems and drain field installation is constantly advancing, the underlying principle of wastewater treatment remains the same – effective treatment of wastewater by soil hydraulic and biological processes.

These domestic waste water management systems have been well-studied, are effectively engineered and designed, and have a well-established reputation for long-term effectiveness for domestic waste water treatment and management.

However, septic systems are also subject to failure – either mechanical or wastewater treatment functional. Some of the failure to functionally treat domestic wastewater is merely a factor of the sustainable life of a septic system and integral drain field. With proper maintenance, septic systems and drain fields generally have a life expectancy of 25-30 years. Unfortunately, some failure is the consequence of inappropriate drain field location.

The purpose of this workshop is to specifically address drain field site suitability characteristics and to provide individuals with interest or need for selection and characterization of suitable septic tank drain fields with the knowledge and skills to accurately assess drain field site selection.

Frame 2: As an introduction, let's review the outcome of a 1998 Analysis of Septic System Failure, conducted by Karen Deal, formerly with the Montana State University Extension Service.

Frame 3: The goal of Karen's study was to identify correlations between septic system failures and improper site evaluation, improper septic tank and drain field installation, and insufficient or inadequate septic tank maintenance. Our focus will be on assessment of landscape and soil conditions in and around the drain field.

Karen conducted an extensive series of site visits and interviews with engineers, inspectors, homeowners, installers, and pumpers. Her number one goal was to determine what factors contribute to septic system failure.

Failure can be defined by one of two conditions: either the inability of the system to hydraulically function properly, which means – not being able to absorb water being discharged into the drain field via the septic tank itself, or the inability of the septic tank and associated drain field to effectively treat the domestic waste water. In the former case, the result or consequence may prove to be aesthetically displeasing and may lead to an environment which is unhealthy to the landowner. In the latter case, the result may have adverse effect on the water supply for the residence or to the underlying aquifer.

In the simplest terms, septic system failure occurs when the soil within the absorption field no longer accepts effluent from the septic tank at the same rate at which waste water is generated.

Frame 4: Montana officials attributed failure to numerous factors, including inadequate size or faulty construction, system age, improper use or maintenance, **tight soils, inappropriate drain field location, and drainfields unlevel or too deep**. The focus of this workshop will be on those factors highlighted – tight soils, i.e., those failing to properly drain, inappropriate drain field location – such as in close proximity to shallow groundwater, and the relationship between drainfield depth and soil material.

The Montana DEQ reports that one of the most frequently occurring circumstances associated with septic system failure is the **inappropriate siting of septic tank drain fields resulting from inadequate site characterization.**

And, the specific characterization issues which appear to be misunderstood the most frequently **are soil structure, structural discontinuities, soil physical and chemical properties, the relationship between septic tank drain field functionality and landscape position, slope, groundwater conditions.**

Frame 5: It goes without saying that the **importance of proper, thorough, and accurate site evaluations** can't be overemphasized. Accurate and correct evaluation can and should be one of the critical 'decisioning' factors in drain field location. Obviously, in the case of permitters, understanding and interpretation of data presented is invaluable.

Not only is it important to correctly perform the site evaluation. It is also important that the information gathered accurately reflects the condition of the site and that the information is accurately recorded.

Probably the three most frequently occurring inadequacies in site evaluation are: **failure to recognize low hydraulic conductivity**, i.e., the inability of water to pass through the soil at a capacity appropriate to the amount of waste water being discharged, **errors in** calculations relating to **sizing of drain fields**, **lack of consideration for** impact **of slope and landscape characteristics** on drain field function, and **failure to recognize soil materials which are prone to failure.**

Frame 6: Both the MT-DEQ and the research conducted by Karen Deal identified **site characteristics which deserve special attention** when it comes to evaluation of sites for drain field suitability. Not surprisingly, these site characteristics relate directly to soil properties. The **commonly occurring circumstances related to failure are:**

> **Gravelly soils** – leading to failure to treat waste water
> **High clay-content soils** – leading to low percolation rates and failure to accept water
> **Shallow groundwater – perennially wet soils** – leading to both failure to accept waste water and failure to treat waste water effectively.

Other factors need to be considered as well, including steep slopes, consolidated soils, textural discontinuities.

Frame 7: I'm sure you are all familiar with the various components of a properly functioning septic system for residential waste water treatment. Our focus in the next day of training will be on the **understanding and evaluation of the drain field component**.

Frame 8: In addition, we'll address the issue of how the soil functions, both chemically and physically, to treat domestic waste water and protect groundwater resources. We also hope to provide you a better understanding of how to assess – and diagnose – the suitability of a given site for a septic tank drain field. All of this takes into consideration issues of soil properties, groundwater, landscape functions, and septic system functions.

Frame 9: Our goal is to help each of you gain a better understanding and working knowledge about the soil, the subsoil, the drain field and the relationship of the functioning of the drain field to the landscape, while recognizing that technology is rapidly changing and demands on the environment are increasing daily.

Frame 10: To put this training session into perspective, here's an outline of what we hope to address during the next day and a half.

Frame 11: The other thing we would like to accomplish is to introduce you to a data recording and entry system the MT DEQ is attempting to develop to guide you and for your use in facilitating site evaluation and permit application submission.

Frame 12: Questions to start with?

File: **1-Introduction DEQ Septic.doc** (goes with ppt by same name)