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If Your Storm Water is as Clear as MudSM – Call us First

Small Area Erosion Control Using:

Direct Soil Application of Dry Polyacrylamides

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Over the last several years, we have encountered several small projects of less than 5,000 square feet which require some form of sediment and erosion control. These jobs are often so small that moving in any equipment, such as hydroseeders or straw blowers, is cost prohibitive, yet, many basic BMPs would not be adequate as “stand alone products”.

Linwood’s technical staff recently concluded an extensive literature review regarding the use of polyacrylamides, including hundreds of articles, journals, magazines, books, and government documents obtained from the Internet, University libraries, and other public and private collections. We have “unearthed” documented application methods for dry, anionic, linear polyacrylamide (WS DOT 2000). This is not a new idea; the methodology was developed by others and a short literature review is included at the end of this article.

For this use, always select a linear, anionic polyacrylamide, often referred to as “PAM”, with low monomer content (Sojka 1998). Never use a PAM product with a monomer content higher than 0.05%; PAM with a monomer concentration over 0.05% is may be cancer causing! PAM with monomer content below 0.05% is readily available and relatively safe to handle. **Because this is for a dry application, the rates per acre can be as much as ten times higher than those used in hydraulic applications** (Tobiason et al 2000). The hydraulic application methods include hydroseeding and hydromulching and these provide much more effective results using lower rates of PAM than do the dry applications. When applied hydraulically, about 3-5 pounds per acre is the standard rate, and between 20-75 pounds is utilized when creating a Polymer Fiber Matrix [aka “PFM”]. Rates up to 400 pounds per acre have been specified (Georgia DOT 1998) by some government agencies.

For dry application over a small area, the PAM is applied using a hand-held fertilizer spreader or “belly grinder” to evenly spread the PAM over the soil surface. It is best if the soil is slightly moist but not saturated or muddy. Apply at a rate of 45-60 pounds per acre or about 1 pound per 1,000 square feet. Apply directly to the soil surface but do not till or incorporate. After the PAM has been applied, you should place a layer of straw over the soil surface; this will break the impact of any raindrops and further help to protect the soil. In place of straw, you can also use erosion control blankets; or in an emergency, leaves or compost. We advise the use of additional BPM’s such as wattles or silt fence. As the rainwater begins to filter through the straw, it will encounter the PAM granules, which will

begin to react and “uncoil”. The PAM will not spread out evenly, which is why you need to use a higher rate to ensure good coverage.(Lenze 1996). As the storm water begins to flow off-site (better known as “run-off”) it will encounter these semi-solublized PAM globules, which in turn will release minute quantities of PAM, gluing down the soil particles and controlling sheet erosion. The PAM will also flocculate the very fine soil particles (silts and clays), causing them to precipitate out of the sediment laden runoff (Sojka 1997), also known as “storm water induced sediment runoff” (which is a highly technical term for what most people just call “muddy water”.)

You may also be interested in our Product Bulletin “*Using Liquid PAM in Ultra Low Volume Spray Equipment*”, which discusses the soil application of concentrated liquid polyacrylamides in a directed spray without the use of water or fibers. Also, you will find, on our website, *Garden Wise*, an enjoyable video made by Monsanto in the 1950's to promote a product called Krillium. Krillium was an early linear polyacrylamide and Monsanto ceased production in the 1970's. The video is a promotional piece but is also scientifically accurate, watch for the depiction of the liner carbon chain and the time lapse photography.

The author, Michael Haile, is a Certified Crop Advisor and a licensed Pest Control Advisor.

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References used to prepare this paper.

Lentz, Shiainberg et al 1992 “Preventing irrigation furrow erosion with small applications of polymers. Soil SCI. Soc. AM J. 56:1926-1932.

Sojka, Lents 1997 “Polyacrylamides: How do they work?”; Runoff, Calif. Chapter Newsletter, Winter; Soil and Water Conservation Soc. 1997

Sojka, Lentz, et al, 1998. “The Pamphlet”. USDA-ARS # 02-98.

Tobiason et al, 2000 “Polymer Use and Testing”, reprinted in Erosion Control Magazine 2001

Washington State DOT Study “Pam Research Project” undated article copied from the Internet on 9-18-2000.

Additional Reading and video:

Soil Science May 1986, Vol. 141, number 5 {This issue was entirely devoted to articles on soil applied polyacrylamides, multiple articles and authors.}

Wallace, A. “Soil conditioner and amendment technologies Vol. I, 1995. Wallace Labs. Includes an extensive bibliography regarding polyacrylamides and other amendments from 1949 through 1995. very insightful.

Haile 2003 Product Bulletin: Retitled “Using Liquid PAM in Ultra Volume Equipment” 2007.

Monsanto, about 1955, “Garden Wise”, Public Domain video, copied from the Internet. An advertisement directed to homeowners - Monsanto no longer produces Krillium. See also Soil Science May 1986.