POLYACRYLAMIDE PRODUCTS AND SOIL EROSION AND SEDIMENTATION CONTROL

TECHNICAL GUIDANCE

The Michigan Department of Environment, Great Lakes, an Energy (EGLE) developed this fact sheet to provide guidance on the use of polyacrylamide products (PAMs) for soil erosion and sedimentation control (SESC).

INTRODUCTION

PAMs are comprised of heavy, long-chain molecules with multiple binding sites that have an affinity for soils. As a result, PAMs are very effective for flocculating and settling out soils from water, preventing erosion of exposed soils and resulting excessive sedimentation and turbidity in surface waters. PAMs are an important component of SESC efforts to reduce soil erosion and sediment pollution of lakes and streams. There are two primary PAM uses for SESC: land application and water treatment.

PAM land applications decrease soil sealing by reducing soil compaction, which reduces runoff by increasing infiltration. PAM land application also binds soil particles, especially clays, to hold them on-site. A prime land use example is the application of PAM to disturbed soil on a construction site to minimize the amount of fine silts and clays suspended in runoff during rain events.

PAM water treatments are used to flocculate and settle solids before discharge to surface waters. A prime water treatment example is PAM applications to construction site detention basin waters for solids settling prior to discharge.

ACCEPTABLE PAMS FOR THE SESC PROGRAM

Although PAMs are effective for SESC, discharge of PAMs to surface water can cause problems. A review of scientific literature and field demonstrations have identified several forms of PAMs that are harmful to the aquatic environment, and therefore are not suitable for use in Michigan SESC. These harmful forms include:

1. Non-food grade PAMs. These PAMs contain residual monomer (acrylamide) in concentrations that may be harmful. To address this concern, only food grade (National Sanitary Foundation/American National Standards Institute) products, or products containing less than 0.05 percent residual monomer by volume, should be used.

2. Any cationic PAM, or a form other than an anionic polymer. Only anionic PAMs are currently known to be of sufficiently low toxicity for SESC.
3. Emulsion-based PAMs, or any polymer that is premixed in a substance other than pure water. The emulsion-based PAMs may contain surfactants and petroleum distillates that can be very toxic to aquatic life.

In summary, PAMs used for SESC should be food grade (or contain <0.05 percent residual monomer), anionic, and water-based.

PAM LAND AND WATER APPLICATION

PAM land application performance is optimized by matching formulation to soil type. Using the wrong form of a PAM on a soil will result in some degree of performance failure, increasing the potential for the PAM to enter surface waters. Therefore, **identification of on-site soil characteristics is essential to determine the correct product for application**.

PAMs are generally land-applied at a rate of up to 10 pounds/acre. Exceeding maximum application rates does not increase the effectiveness of the product. In addition, applying these materials at rates beyond 10 pounds/acre may result in a violation of Michigan's Water Quality Standards as described by Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Under most circumstances, when nonemulsion anionic PAMs are used correctly and in conjunction with existing erosion control best management practices (BMP), land applied PAMs should not enter surface waters of the state in toxic amounts.

When submitting your SESC Permit Application, please describe any use of PAMs for soil erosion control with all other BMPs in your soil erosion control plan.

REGULATORY APPROVALS

Some PAM application types are preapproved provided this Technical Guidance is followed. Other application types require specific regulatory approvals. The need for approvals for the different types of applications is as follows:

1. PAM applied to land at construction sites less than one acre in size: no other approval needed provided the Technical Guidance is followed.
2. PAM applied to land or storm water retention ponds (i.e., the pond does not have an outlet other than an emergency overflow) under Permit-by-Rule (total earth disturbance of one or more acres, and with a point source discharge of storm water to waters of the state, either directly or through a separate storm sewer): no other approval needed provided the Technical Guidance is followed.

3. PAM applied to land by Authorized Public Agency (APA): no other approval needed provided the Technical Guidance is followed AND a description of the PAM application has been included in the APA's Approved Procedures.
4. PAM discharged to surface waters of state (stream, river, drain, lake, etc.) under National Pollutant Discharge Elimination System (NPDES) permit (except Permit-by-Rule (Permit-by-Rule refer to #5): Water Treatment Additive approval is needed (EGLE - Non-Select Water Treatment Additives Discharge Application Instructions).
5. PAM discharged or applied to surface water, no NPDES permit in place OR Permit-by-Rule: Individual Rule 97 Certification of Approval is needed (EGLE - Rule 97 - General Information)

WHERE TO GO FOR HELP

Any questions about this Technical Guidance can be directed to contact the Water Resources Division, Soil Erosion and Sedimentation Control Program, through EGLE's Environmental Assistance Center at 800-662-9278 or contact:

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