Anne Arundel Soil Conservation District

Land Application of Polyacrylamide General Guidance

(Note: The following information was adapted from the California Stormwater BMP Handbook, EC-13)

Description and Purpose:

Polyacrylamide (PAM) is a chemical that can be applied to disturbed soils at construction sites to reduce erosion and improve settling of suspended sediment.

PAM increases the soil's available pore volume, thus increasing infiltration and reducing the quantity of stormwater runoff that can cause erosion. Suspended sediments from PAM treated soils exhibit increased flocculation over untreated soils. The increased flocculation aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

Suitable Applications:

PAM is suitable for use on disturbed soil areas that discharge to a sediment trap or sediment basin. PAM is typically used in conjunction with other BMPs to increase their performance.

PAM can be applied to the following areas:

- Rough graded soils that will be inactive for a period of time.
- Final graded soils before application of final stabilization (e.g., paving, planting, mulching).
- Temporary haul roads prior to placement of crushed rock surfacing.
- Compacted soil road base.
- Construction staging, materials storage, and layout areas.
- Soil stockpiles.
- Areas that will be mulched.
- To newly excavated traps and basins bottom and side slopes to help prevent turbidity from inflow of runoff into the traps and basins.

Limitations:

- There is limited experience in Anne Arundel County with use of PAM for erosion and sediment control.
- PAM shall not be directly applied to water or allowed to enter a water body.
- Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.

- PAM will work when applied to saturated soil but is not as effective as applications to dry or damp soil.
- Some PAMs are more toxic and carcinogenic than others. Only the most environmentally safe PAM products should be used.
- The specific PAM copolymer formulation must be anionic. **Cationic PAM shall not be used in any application because of known aquatic toxicity problems**. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, will be used for soil applications
- PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".

Implementation:

PAM shall be used in accordance with the following general guidance:

- Pam shall be used in conjunction with other BMPs and not in place of other BMPs, including both erosion controls and sediment controls.
- Stormwater runoff from PAM treated soils should pass through a sediment control BMP prior to discharging to surface waters.
- When the total drainage area is greater than or equal to 5 acres, PAM treated areas shall drain to a sediment trap or basin.
- Do not add PAM to water discharging from site.
- On PAM treated sites, the use of silt fence and fiber rolls shall be maximized to limit the discharges of sediment to sediment traps and sediment basins.
- All areas not being actively worked on should be covered and protected from rainfall. PAM should not be the only cover BMP used.
- PAM can be applied to wet soil, but dry soil is preferred due to less sediment loss.
- Keep the granular PAM supply out of the sun. Granular PAM loses its effectiveness in three months after exposure to sunlight and air.
- Proper application and re-application plans are necessary to ensure total effectiveness of PAM usage.
- PAM, combined with water, is very slippery and can be a safety hazard. Care must be taken to prevent spills of PAM powder onto paved surfaces. During an application of PAM, prevent over spray from reaching pavement, as pavement will become slippery. If PAM powder gets on skin or clothing, wipe it off with a rough towel rather than washing with water. This only makes cleanup messier and longer.
- Recent high interest in PAM has resulted in some entrepreneurial exploitation of the term "polymer". All PAMs are polymer, but not all polymers are PAM, and not all PAM products comply with ANSI/NSF Standard 60.
- The PAM anionic charge density may vary from 2-30%; a value of 18% is typical. Studies conducted by the United States Department of Agriculture (USDA)/ Agricultural Research Service (ARS) demonstrated that soil stabilization was optimized by using very high molecular weight (12-15 mg/mole), highly anionic (>20% hydrolosis) PAM.

- PAM tackifiers are available and being used in place of guar and alpha plantago. Typically, PAM tackifiers should be used at a rate of no more than 0.5-1 lb per 1,000 gallons of water in hydro mulch machine. Some tackifier product instructions say to use at a rate of 3-5 lbs per acre, which can be too much. In addition, pump problems can occur at higher rates due to increased viscosity.

Preferred Application Method:

PAM may be applied in dissolved form with water, or it may be applied in dry, granular, or powered form.

The specific PAM formulation and rate of application is unique to each site depending upon the soil types present. Prior to the commencement of site grading, soil samples should be taken and forwarded to an experienced PAM consultant for laboratory analysis. The PAM consultant should recommend the type of PAM to be utilized, and the application rate and methodologies to be employed. The PAM recommendations should be forwarded to the Anne Arundel Soil Conservation District for approval.

The preferred application method is the dissolved form. When applying with water, it should be noted that PAM has infinite solubility in water, but dissolves very slowly. Dissolve pre-measured dry granular PAM with a known quantity of clean water in a bucket several hours or overnight. Mechanical mixing will help dissolve the PAM. Always add PAM to water - not water to PAM. Higher concentrations of PAM than those recommended by the PAM consultant **do not** provide any additional effectiveness.

Inspection and Maintenance:

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Areas where erosion is evident should be repaired and BMP's re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMP's.
- PAM must be reapplied on actively worked areas after a 48-hour period if PAM is to remain effective.
- Reapplication is not required unless PAM treated soil is disturbed or unless turbidity levels show the need for an additional application.
- If PAM treated soil is left undisturbed, a reapplication may be necessary after two months.
- More PAM applications may be required for steep slopes, silty and clayey soils (USDA Classification Type "C" and "D" soils), long grades, and high precipitation areas.
- When PAM is applied first to bare soil and then covered with straw, a reapplication may not be necessary for several months.
- Discharges from PAM treated areas must be monitored for non-visible pollutants.

References

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