

SEPTEMBER 21-25, 2026

STORMWATERAWARENESS.ORG



STORM WATER AWARENESS WEEK 2026

September 22, 2026

Let's Talk Floc:

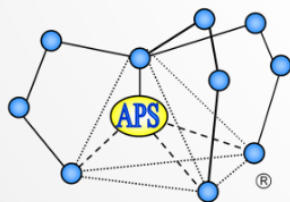
Dust Off Your BMPs: Modern Strategies for NPDES- Compliant Dust Control

Brian M. Free

CPESC, CPSWQ, QSD, CPAg

Director of Business Development

bfree@apsfloc.com



**APPLIED POLYMER
SYSTEMS, INC.**



Why Are We Talking About Dust?

EROSION: the process by which soil particles are detached and transported by the actions of wind, water, or gravity.

- **Dust is more than a “Housekeeping” Issue**
 - Dust is a vector pollutant affecting both air and stormwater quality
- **The Hidden Compliance and Cost Risks of Dust**
 - Poor Dust Control Can Trigger:
 - NPDES permit violations
 - SWPPP deficiencies
 - Increased inspection scrutiny, findings, and corrective actions
- **Don’t Let Dust Undermine Your Compliance—or Your Budget**
 - Move beyond the Status Quo ... “We’ve always used water”



Dust Is a Compliance Risk

- Dust is Not Just an Air Issue
- How Fugitive Dust Becomes a Stormwater Problem...

Pathway:

Airborne particulates >

Deposition on ground, pavement, equipment, structures >

Storm events wash particulates into runoff

This is where dust control intersects directly with NPDES permits.

Regulatory Framework Overview

Where Dust Control Fits Under NPDES

- Construction General Permit (CGP)
- Multi-Sector General Permit (MSGP)

*Dust control obligations exist in *both*, even if not labeled “dust” explicitly

CGP Requirements Related to Dust

- Construction Sites: Pollutant Minimization
- EPA 2022 CGP – Part 2.1.2 (Erosion and Sediment Controls):
 - “You must implement erosion and sediment controls to minimize the discharge of pollutants from exposed areas, including minimizing the amount of soil exposed during construction activity.”
- EPA 2022 CGP – Part 2.1.1 (Stormwater Pollution Prevention):
 - “You must minimize the generation of pollutants on the site and ensure that stormwater controls are designed, installed, and maintained to be effective.”

MSGP Requirements Related to Dust

- Industrial Sites: Exposure Reduction
- EPA 2021 MSGP – Part 2.1.2.1 (Minimize Exposure):
 - “You must minimize the exposure of industrial materials and activities to precipitation and stormwater runoff in order to prevent or reduce pollutant discharges.”
- EPA 2021 MSGP – Part 2.1.2.5 (Good Housekeeping):
 - “You must keep clean all exposed areas of your site that are potential sources of pollutants, including using control measures to reduce or eliminate the tracking or blowing of raw, final, or waste materials.”

Dust Control as a “Preventative Maintenance” BMP

- EPA 2021 MSGP – Part 2.1.2.4 (Preventive Maintenance):
 - “You must maintain all control measures in effective operating condition and take corrective action when control measures are not functioning as intended.”
- Frequent watering can actually signal that your BMP isn’t “functioning as intended”.
- Longer-lasting controls reduce scrutiny and minimize corrective actions.

What Inspectors Look For

- **How Dust Control Is Evaluated in the Field**
- **Inspection Realities:**
 - Visual dust emissions
 - Track-out
 - Evidence of ineffective or short-lived BMPs
- **Dust control failures often trigger follow-up corrective actions.**

Dust Control: Inspection Red Flags

What Raises Eyebrows During Inspections

- Visible dust plumes during dry conditions
 - Reliance on water trucks with no documented schedule
 - Dry, powdery soils on haul roads or laydown areas
 - Dust tracked onto paved surfaces or deposited on vehicles, equipment, and structures
 - BMPs listed in SWPPP but not implemented consistently
-
- **Inspectors don't need to measure dust to cite it.**
 - Visual observations are enough.
 - If dust is clearly migrating, inspectors often question whether BMPs are *“effective,”* which is a permit standard.

Dust Control: Best Practices

- **What Inspectors Like to See**
 - Stabilized Soil Surfaces with Visible Binding
 - BMPs Matched To Site Conditions (Traffic, Duration)
 - Reduced Need For Constant Reapplication
 - Clear Documentation In SWPPP And Inspection Logs
 - Minimal Visible Dust Even During Dry Weather
- ***Best Practices Aren't About Perfection—they're About Demonstrated Control.***

Red Flags vs. Best Practices

Red Flags	Best Practices
No Justification For BMP Choice	Engineered Dust Suppression BMP (Defensible)
“We Water When It Looks Dusty”	Documented Guidance for Application Rates / Intervals
Dust Returns Within Hours	Reduced Reapplication Frequency
High Water Use During Restrictions	Water Conservation Documented

Reframe **Dust Control** As a **Management System**,
Not a Reaction!

Why Dust Control Choices Matter

- **Impacts Enforcement**
 - Ineffective BMPs = Corrective Actions
 - Repeat Observations = Increased Scrutiny
 - Poor Documentation = Harder To Defend
 - Better BMPs = Fewer Inspection Findings, Less Corrective Actions
- Dust Alone Doesn't Always Lead To Enforcement Actions...
But It Contributes To a *Pattern* Inspectors Don't Like.
- Effective BMPs = Effective Risk Management

The Status Quo

- **Why Water Became the Default Dust Control Method**
 - Easy
 - Familiar
 - Low Upfront Cost (?)
 - Depends Where You Are Working
- Familiarity Doesn't Equal Compliance or Efficiency

The Compliance and Sustainability Paradox

- **Water Is a Short-Term Fix That Creates Long-Term Challenges**
- **Operational Realities of Water-Only Dust Control**
 - Short-lived Effectiveness (Evaporation, Traffic Disturbance)
 - Increased Labor, Equipment, and Fuel Costs due to Frequent Reapplication
 - Excessive Water Use During Drought or Water Restrictions
 - Potential To **Increase Runoff Volume And Pollutant Transport**
- Over Reliance on Water Usage to Meet Environmental Regulations?

Water and Climate Reality

- **Dust Control in a Water-Constrained World**
 - Water-Only Dust Control Is Increasingly Unsustainable
- Drought Conditions
- Water Restrictions
- Rising Costs

Modern Dust Suppression Options

Beyond Water Trucks...

- **Chloride Salts (Calcium Chloride / Magnesium Chloride)**
 - Hygroscopy is the phenomenon of attracting and holding water molecules via either absorption or adsorption from the surrounding environment.
- **Vinyl/Ethylene Co-Polymers (Polyvinyl Acrylates)**
 - Upon drying, these polymers form a flexible film over the soil surface binding soil particles together therefore reducing their ability to become airborne. Creates an impermeable membrane that prevents water infiltration.
- **Anionic PAM-based solutions (Anionic Polyacrylamide)**
 - Bind soil particles together through flocculation (agglomeration) and enhance water infiltration and vegetation establishment.

Comparison of Dust Palliatives

	Functional Longevity	Environmental Impact	Ease of Application	Equipment Impact	Volume Required	Sustainability	Cost
Water-only	X	X	✓	X	X	X	X
Chloride Salts	✓	✓	✓	X	X	X	X
Vinyl/Ethylene Co-Polymers	✓	✓	X	X	X	X	X
Anionic PAM	✓	✓	✓	✓	✓	✓	✓

*This chart is intended to frame a conversation of dust palliatives compared to water and is not an exhaustive list of pros/cons of various solutions. Each option above could have a different evaluation based on other outstanding criteria.

Selecting the Right Dust Control Method: BMP Decision Framework

- **Matching BMPs to Site Conditions**
 - Site-Specific Variables Must Be Considered
- **Evaluation criteria:**
 - Soil type, Slope Gradients, Terrain
 - Environmental Factors – Rainfall, UV, Prevailing Winds, Exposure
 - Traffic intensity
 - Project duration
 - Proximity to sensitive waters, infrastructure, people
- **Documenting BMP Selection for Compliance**
 - Ties back to permit expectation of site-specific BMPs

Documenting BMP Selection

Making Your Choice Defensible

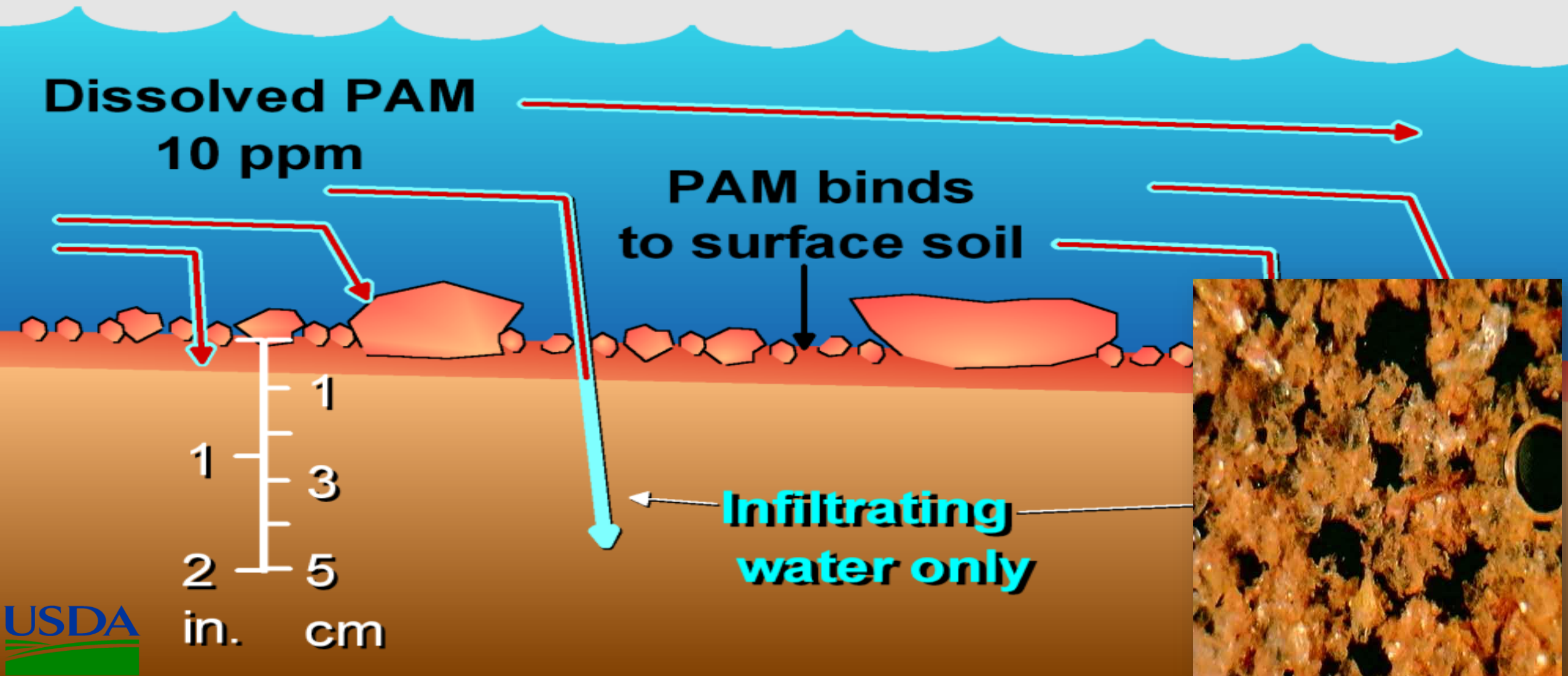
- **PAM based Dust Palliatives are easily and readily defensible in:**
 - SWPPP narratives
 - BMP logs
 - Inspection reports
- **Refer to Relevant permit language CGP/MSGP:**
 - “Minimize exposure”
 - “Implement effective BMPs”
 - “Stabilize disturbed soils”
 - “Using Control Measures to Reduce or Eliminate...blowing materials”
 - “Minimize the generation of pollutants”
 - “Site Specific Control Measures”

Why PAM-Based Palliatives

Anionic Polyacrylamide (PAM) Overview

- **Safe and Accepted**
 - Approved Use Under US EPA Construction General Permit
 - Extremely Low Toxicity
 - **Anionic PAM** (Negative Charge) Safe For Fish/Aquatic Organisms
 - ANSI/**NSF**/CAN Certification: Standard 60 Drinking Water Treatment Purity Grade Chemical
 - Used for Soil Stabilization, Water Clarification and Mud Thickening
- **How PAM Works:**
 - Binds Fine Particles
 - Stabilizes Soil Surface
 - Reduces Nuisance/Fugitive Dust
 - Long Lasting with Reduced Need for Reapplication

PAM-Treated Furrow Irrigation



USDA PAM Research:

- Reduced Erosion
- Reduced Fertilizer Export
- Improved Water Infiltration and Increased Crop Yields
- Extremely Low Risk to Aquatic Life with Anionic PAM (-)



SLOPE DEMONSTRATION





Environmental Advantages

PAM Provides Superior Performance Without the Tradeoffs

PAM Compared to Other Products:

- Lower Toxicity
- No Corrosion, Easy to Clean
- Minimal Runoff Impact
- Less Material Needed per Application (lower freight, less packaging to discard)
- Long Lasting = Less Applications

PAM is *environmentally benign and effective*.

How PAM-Based Dust Control Is Applied



Application Rates & Methods

Doing It Right The First Time

- **Spray Application**
 - **Water Truck** (PAM Emulsion)
 - **Hydroseeder** (PAM Emulsion or PAM Powder)
- **Dry Application**
 - Broadcast Spreader, Tractor Implements, Leaf Blower with Attachment, Drone
- **Typical Rates Of PAM Emulsion**
 - 1-3 Gallons of PAM Emulsion per Acre (No Traffic)
 - 3-5 Gallons of PAM Emulsion per Acre (Traffic)
- **Typical Rates Of PAM Powder**
 - 10 – 50 lbs. per Acre
 - Depends on: Soil Type, Slope Gradient, Precipitation, Exposure
- **Always Follow Manufacturer Guidance.**
 - Do Not Mix More Than 1 Gallon of Pam Emulsion in 1,000 Gallons of Water
(Always Add Pam to Water, Not Water to Pam)
 - Do Not Mix More Than 10 lbs. of PAM Powder in 1,000 Gallons of Water

Maintenance & Longevity

After Application

- Monitoring Intervals Specified in the Plan
- Reapplication Triggers
 - Time Vs. Precipitation Based
 - Touch Up Vs. Wholesale Reapplication
- Performance Under Traffic
 - Water-only Maintenance Applications

Untreated Soil
Treated Soil
20-30 mph wind
23% soil loss 11% soil loss
15 minutes

Soil and Lab Testing



**Water Isn't Nature's
Only Erosive Force.**

Application Options



Liquid PAM Emulsion



Granular PAM

Construction Site Case Study

Active Homebuilding Site

Problem:

Dust from Ongoing Construction Activities at a Homebuilding Site Was Negatively Impacting Previously Completed Phases and the Surrounding Community.

Solution: Apply Liquid Pam Emulsion to Dirt/Gravel Roads and Completed Pads.

Resolution: Effective Dust Suppression Mitigated Nuisance Dust Onsite as well as Fugitive Dust Leaving the Site which Appeased Regulatory Agencies, Residents, and Adjacent Community Members.





Hydroseeder Applying PAM Emulsion to Roads and Pads

Application Rate:

**2 gallons of PAM Emulsion in
3,000 gallons of Water per Acre**



Stabilized Pads on Homebuilding Site



Before and After PAM Emulsion Treatment on Roads

These Videos Were Taken of the
Same Road 3 Weeks Apart

Highlighting the Effectiveness of
PAM Dust Suppression

Treatments of Dirt/Gravel Roads



Industrial Site Case Study

Landfill

Problem:

- Fugitive Dust from Landfill Operations Next to Major Theme Park
- Watering 10-12 Times a Day – Still Not Effective
- Constant Heavy Traffic (7 days / week)

Solution:

- Dry PAM Powder Applied to Haul Roads at a rate of 20 lbs. / acre.
 - Polymer was Performance Matched to Soils on Site
- PAM was Watered In at a Rate of 3,000 gallons of Water per Acre
- Maintenance - Water was Applied 1 Time Per Day To Keep Polymer Bonds Damp/Pliable

Resolution:

- Successful Dust Control
- Prevented Dust Generation For 90 Days (3 Months) From Initial Application
- Greater than 90% reduction in water usage



**Drought Conditions Produced
Dust Which Was Controlled With
Water Applications Up To 12
Times Per Day (Not Effective)**



Granular PAM Applied with Fertilizer Spreader



Water Application



**PAM Treatment
Penetrates 4-6
Inches Into Soil**



**Watering Reduced From 12 Times/Day
To 1 Time/Day
(No Additional PAM Needed For 90 Days)**

Canadian Construction Site

Wind Gusts 30-45 mph



Water Application Ineffective
for Dust Control



No Significant Dust/Soil Loss
After Dust Stop Application

Dust Control and Sustainability

Beyond Permit Compliance

Efficient Dust Control is Tied to:

- Water conservation
- Improved Air and Water Quality
- ESG Goals
- Good Reputation with Regulators and Community

Key Takeaways & Action Steps

What You Should Rethink

- Dust = Pollutant
- Water-only is Often Inadequate for Dust Control
- PAM-based BMPs are **Defensible** and **Effective**

What to Do When You Get Back to Your Site

- Review Dust BMPs In Your SWPPPs / Design Plans / ESC & SW Handbooks
- Consider a Pilot Program Utilizing PAM Based Dust Control Solutions
- Train Crews

Final Thought

- **Modern Challenges Require Modern BMPs**
- **Move Beyond The Status Quo to Improve:**
 - Compliance
 - Reputation
 - Operational Efficiency (Profits)
 - Environmental Outcomes

A serene landscape photograph of a lake at sunset. The sun is low on the horizon, casting a warm, golden glow across the sky and reflecting on the water's surface. In the foreground, several birch trees with white bark and green leaves are visible, some framing the scene. A wooden dock extends from the shore into the lake. In the distance, a range of low mountains is visible under the twilight sky.

Thank you!

Brian M. Free CPESC, CPSWQ, QSD, CPAg

[**bfree@APSfloc.com**](mailto:bfree@APSfloc.com)

mobile: **336-458-6211**