Best Available Technology (BAT) for Addressing Turbid Discharges

Randy Greer, P.E.
DNREC/SSP

Permitting

- Sediment and Stormwater Plan
- DNREC Water Supply Branch
- DNREC Surface Water Discharges Branch
- DNREC Wetland and Subaquaous Branch
- USACOE

Permitting

- Sediment and Stormwater Plan
- **DNREC Water Supply Branch**
- DNREC Surface Water Discharges Branch
- DNREC Wetland and Subaquaous Branch
- USACOE

The Who, What, and Why's of Dewatering permits?

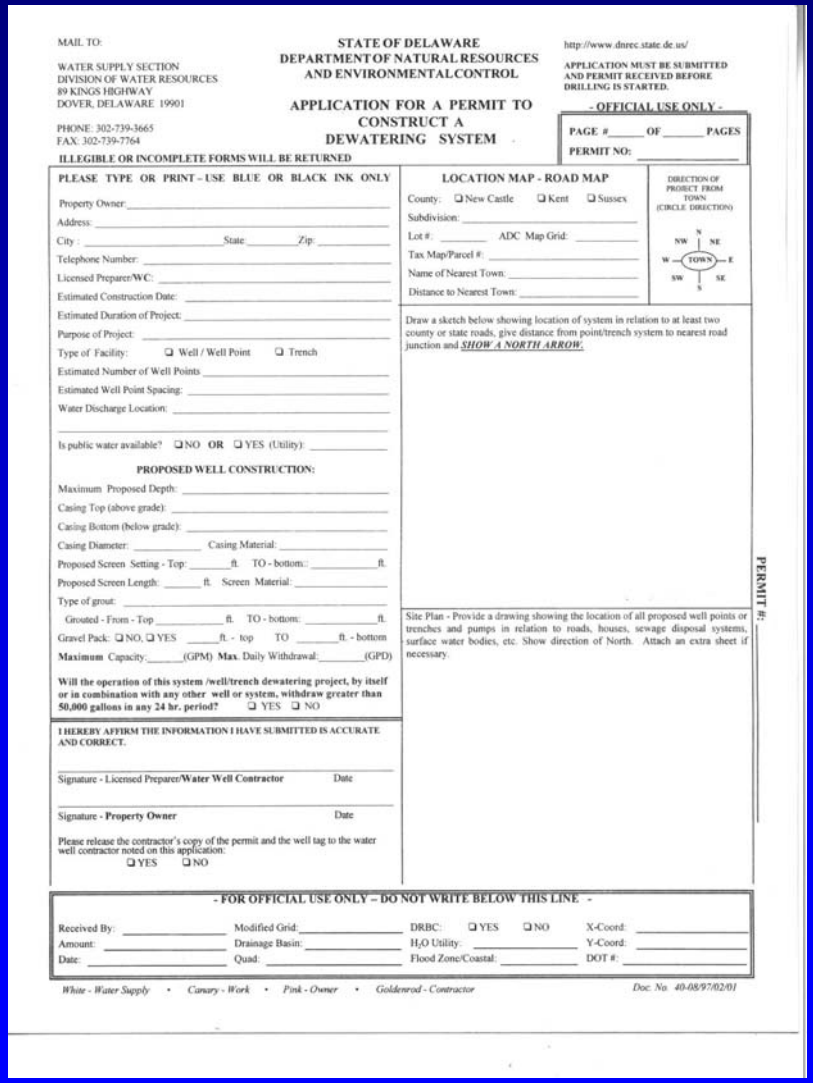
- Def. A well used to remove ground water for the construction of footings, sewer line, building foundation, elevator shafts, etc.
- Who needs a dewatering permit?
  - EVERYONE!
- When do you need a dewatering permit?
  - When you encounter groundwater.

Licensing Requirements

- ✓The Dept. has a dewatering license, a step down from the well drillers license.
- ✓Step one: send in the application and fees
- ✓Step two: the application is reviewed by the monthly licensing board.
- ✓Step three: passing a test given quarterly.
- ✓Call (302) 739-9944 for any other questions on licensing.

Dewatering Permit Application

- Duration of project
- Trench/well point/sumps
- Construction date
- Purpose
- Discharge location
- Max capacity gpm & gpd
- Tax parcel - owner
- Permit application is in triplicate carbon form; (now available online)
- Zoning certificate from County Website.



MAIL TO:

WATER SUPPLY SECTION
DIVISION OF WATER RESOURCES
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

PHONE: 302-739-3665
FAX: 302-739-7764

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

APPLICATION FOR A PERMIT TO CONSTRUCT A DEWATERING SYSTEM

http://www.dnrec.state.de.us/

APPLICATION MUST BE SUBMITTED AND PERMIT RECEIVED BEFORE DRILLING IS STARTED.

- OFFICIAL USE ONLY -

PAGE # _____ OF _____ PAGES

PERMIT NO: _____

ILLEGIBLE OR INCOMPLETE FORMS WILL BE RETURNED

PLEASE TYPE OR PRINT – USE BLUE OR BLACK INK ONLY

Property Owner: _____
Address: _____
City: _____ State: _____ Zip: _____
Telephone Number: _____
Licensed Preparer/WC: _____
Estimated Construction Date: _____
Estimated Duration of Project: _____
Purpose of Project: _____
Type of Facility: ❑ Well / Well Point ❑ Trench
Estimated Number of Well Points _____
Estimated Well Point Spacing: _____
Water Discharge Location: _____

Is public water available? ❑ NO OR ❑ YES (Utility): _____

PROPOSED WELL CONSTRUCTION:

Maximum Proposed Depth: _____
Casing Top (above grade): _____
Casing Bottom (below grade): _____
Casing Diameter: _____ Casing Material: _____
Proposed Screen Setting - Top: _____ ft. TO - bottom: _____ ft.
Proposed Screen Length: _____ ft. Screen Material: _____
Type of grout: _____
Grouted - From - Top _____ ft. TO - bottom: _____ ft.
Gravel Pack: ❑ NO, ❑ YES _____ ft. - top TO _____ ft. - bottom
Maximum Capacity: _____ (GPM) **Max.** Daily Withdrawal: _____ (GPD)

Will the operation of this system /well/trench dewatering project, by itself or in combination with any other well or system, withdraw greater than 50,000 gallons in any 24 hr. period? ❑ YES ❑ NO

I HEREBY AFFIRM THE INFORMATION I HAVE SUBMITTED IS ACCURATE AND CORRECT.

Signature - Licensed Preparer/**Water Well Contractor** Date

Signature - **Property Owner** Date

Please release the contractor's copy of the permit and the well tag to the water well contractor noted on this application:
❑ YES ❑ NO

LOCATION MAP - ROAD MAP

County: ❑ New Castle ❑ Kent ❑ Sussex
Subdivision: _____
Lot #: _____ ADC Map Grid: _____
Tax Map/Parcel #: _____
Name of Nearest Town: _____
Distance to Nearest Town: _____

DIRECTION OF PROJECT FROM TOWN (CIRCLE DIRECTION)

N, NW, NE, W, TOWN, E, SW, SE, S

Draw a sketch below showing location of system in relation to at least two county or state roads, give distance from point/trench system to nearest road junction and ***SHOW A NORTH ARROW.***

Site Plan - Provide a drawing showing the location of all proposed well points or trenches and pumps in relation to roads, houses, sewage disposal systems, surface water bodies, etc. Show direction of North. Attach an extra sheet if necessary.

PERMIT #: _____

- FOR OFFICIAL USE ONLY – DO NOT WRITE BELOW THIS LINE -

Received By: _____ Modified Grid: _____ DRBC: ❑ YES ❑ NO X-Coord: _____
Amount: _____ Drainage Basin: _____ H_2O Utility: _____ Y-Coord: _____
Date: _____ Quad: _____ Flood Zone/Coastal: _____ DOT #: _____

White - Water Supply • Canary - Work • Pink - Owner • Goldenrod - Contractor

Doc. No. 40-08/97/02/01

Dewatering Permit Application

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- Trench/well point/sumps
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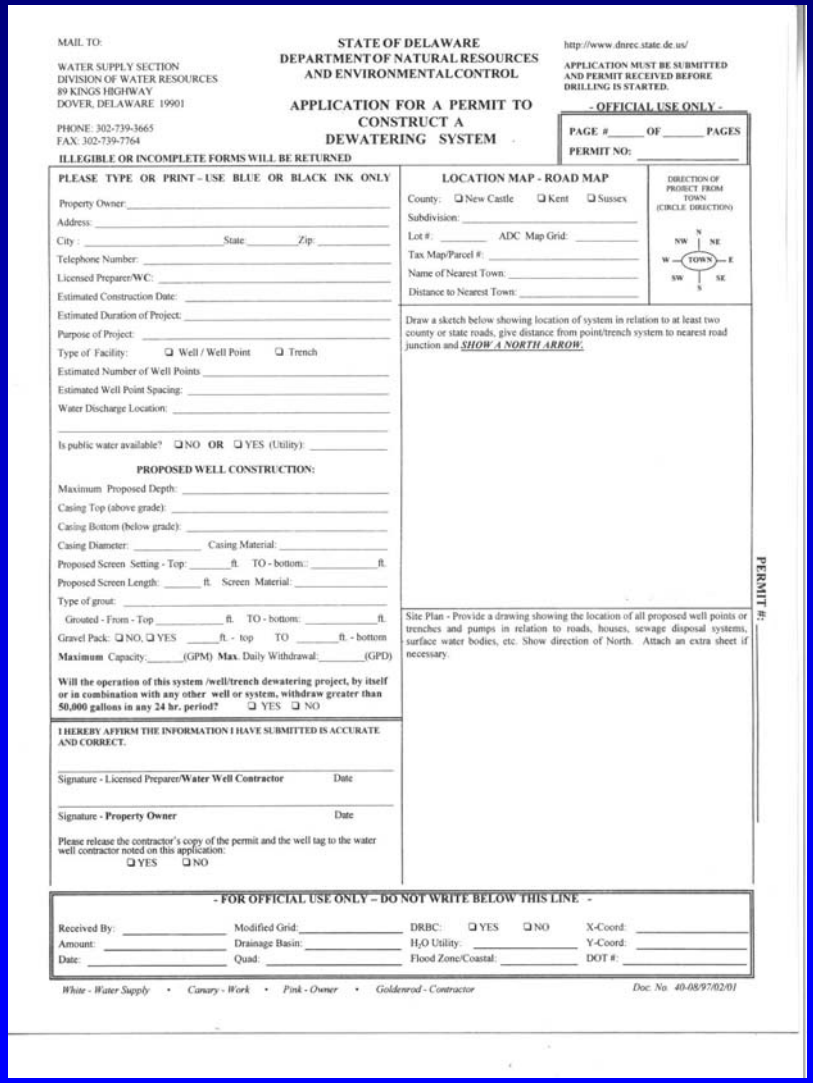

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White - Water Supply • Canary - Work • Pink - Owner • Goldenrod - Contractor

Doc. No. 40-08/97/02/01

Advertisements

- New requirement only if over 1 million gpd, (700 gpm) needs advertising.
- Legal notice submitted by Wed.
- Ad runs in Sunday paper
- 15 day public comment
- Issued the second Tues.
- $100 fee for all wells being advertised

Division of Water
- About Us
- Contact Us
- Director's Message
- Division Management
- DNREC Newsroom
- DNREC Public Meeting Calendar
- DNREC Public Notices
- Employment
- Site Map

Information
- Chesapeake_WIP
- DWR Publications
- DWR-FOIA
- Frequently Asked Questions
- Harim/Vlasic Pinnacle site information
- Permits
- Regulations Overview

Libraries

Services
- Other Services
- Environmental Laboratory
- Environmental Navigator
- Financial Assistance Branch proposed Rehoboth ocean outfall
- Ground Water Discharges
- Surface Water Discharges
- Water Supply
- Water Supply Coordinating Council
- Wetlands and Subaqueous Lands

Division of Water Division of Water

Water Supply Section - **Well Permits Branch**

The Well Permits Branch is responsible for managing and issuing well construction and use permits for wells that withdraw 50,000 gallons or less of water daily. That responsibility includes conducting inspections of wells, licensing companies and individuals who construct wells and install and repair or service pumps in and for wells, and maintaining a data base on the construction and status of all wells for which a well construction or use permit has been issued.

Well Construction and Use Permits:

The Delaware Regulations Governing the Construction and Use of Wells was revised effective April 1, 1997. It contains criteria for obtaining a well permit and constructing wells. A licensed water well contractor must complete and sign the application form. The property owner's signature is also required on the application. An Agent Authorization form may be submitted to substitute a signature other than the owner's signature on the well permit application form. The Agent Authorization form must be signed by the property owner and must be notarized. It is designed for use in instances when the owner is or will not be available to sign the application form and wishes to designate another person to act for them in that respect.

All wells in Delaware must be constructed by a well driller or well driver licensed with this agency. The required application and reporting forms are available to licensed water well contractors upon request. The General Requirements and Guidelines for the Construction of Monitor and Observation Wells contain specific regulatory requirements as well as additional recommendations for use by engineers, designers and contractors to use when preparing monitor and observation well applications.

Proposed Delaware Regulations Governing the Construction and Use of Wells

Contractor License Requirements:

The Regulations for Licensing Water Well Contractors, Pump Installer Contractors, Well Drillers, Well Drivers and Pump Installers contains the requirements for obtaining licenses as a water well contractor, pump installer contractor, pump installer, well driller and well driver. The Application for License form must be used when submitting an application for any of the licenses. Applications for well driller, well driver and pump installer licenses must be submitted with two Professional Reference Forms. Applications for water well and pump installer contractor licenses must be submitted with a copy of the company's certificate of insurance reflecting a minimum coverage of $100,000 contractor liability insurance. All applications for new licenses must be completed in detail, signed and notarized.

The Regulations for Licensing Water Well Contractors, Pump Installer Contractors, Well Drillers, Well Drivers and Pump Installers revised in 1999 require that well drillers, well drivers and pump installers obtain continuing education hours in order to renew their licenses for the next calendar year. Several forms are availbale to facilitate the requirement. They are the Application for Renewal of Water Well Contractor or Pump Installer Contractor License; Application for Renewal of Well Driller, Well Driver, Pump Installer License; Request for Approval of Training Program; and Continuing Education Certification for License Renewal.

The most recent revisions to the Regulations for Licensing Water Well Contractors, Pump Installer Contractors, Well Drillers, Well Drivers and Pump Installers, were effective January 1, 2003.They clarify the continuing education requirements and reorganize the regulations into a more concise and reader friendly document, thereby reducing the potential for future misinterpretations.

Permit Application and License Fees:

Fees for licenses and permit applications, including permits handled by the Water Allocation Branch, can be found by clicking on Application and License Fees.

Contractor Information and Updates:

- Important Notice to Water Well Contractors
- Emergency Well Procedures
- Licensed Water Well Contractors

Forms

- Draft Well Permit Application
- Request for Reduced Isolation Distance to Property Line

Comments and/or suggestions regarding Contractor Information and Updates, please e-mail Alan.Pongratz@state.de.us.

Branch Supervisor: Alan Pongratz
Email: Alan.Pongratz@state.de.us
Phone: 302-739-9944

Typical Dewatering Situations Associated with Construction Activities

- Clear Groundwater
  - Well pointing, large diameter wells
- Disturbed Area Intersects Groundwater
  - Excavations/Pond Construction
- Sediment Laden Runoff
  - Sediment Basins/Traps

How To Make Clean Water Dirty

Common Sense Goes A Long Way!

Dewatering “Needs”

- **Need** to anticipate & plan the dewatering activity
- **Need** to use an approved method (ESC Handbook)
- **Need** to have applicable permits
- **Need** to involve the review/approval agency
- **Need** to monitor the dewatering operation

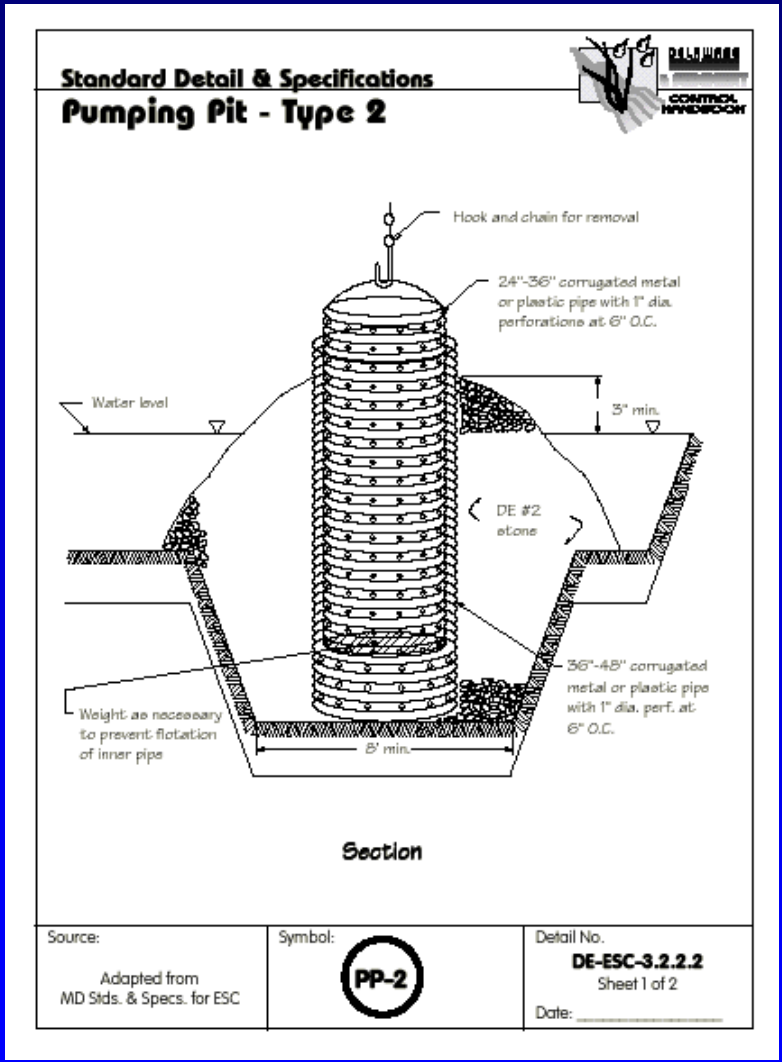
Dewatering Solutions

Clean Water Diversions

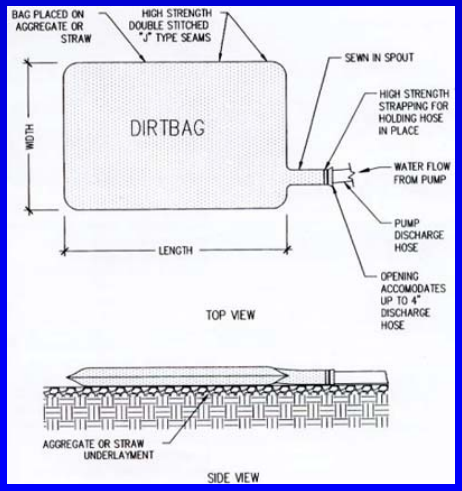
Dewatering Devices

Current Dewatering Technique

Pumping Pit


Standard Detail & Specifications
Pumping Pit - Type 2
Hook and chain for removal
24"-36" corrugated metal or plastic pipe with 1" dia. perforations at 6" O.C.
Water level
3" min.
DE #2 stone
36"-48" corrugated metal or plastic pipe with 1" dia. perf. at 6" O.C.
Weight as necessary to prevent flotation of inner pipe
8' min.
Section
Source:
Adapted from MD Stds. & Specs. for ESC
Symbol:
PP-2
Detail No.
DE-ESC-3.2.2.2
Sheet 1 of 2
Date:

Geotextile Bags



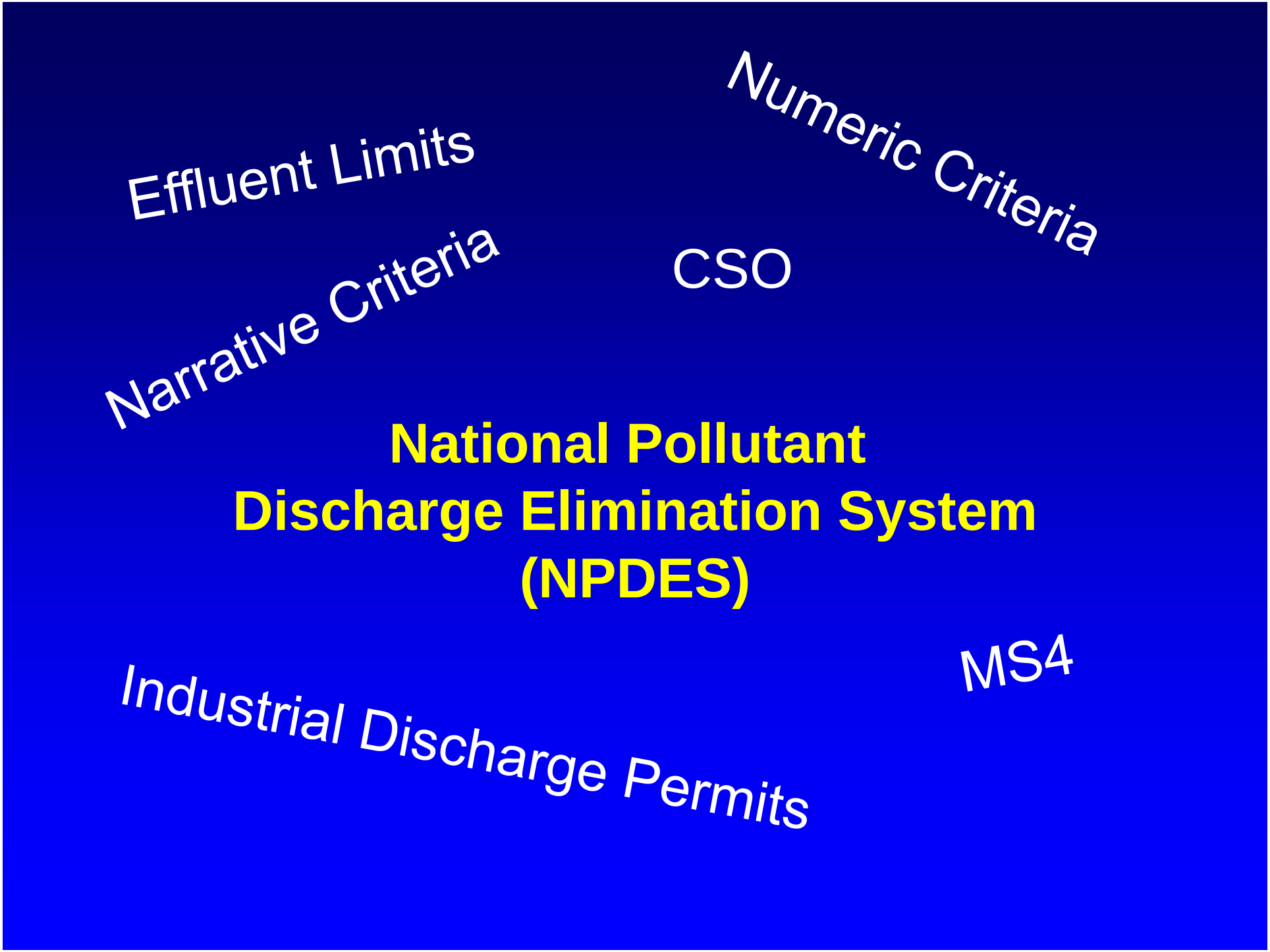
Dewatering Pit/Basin

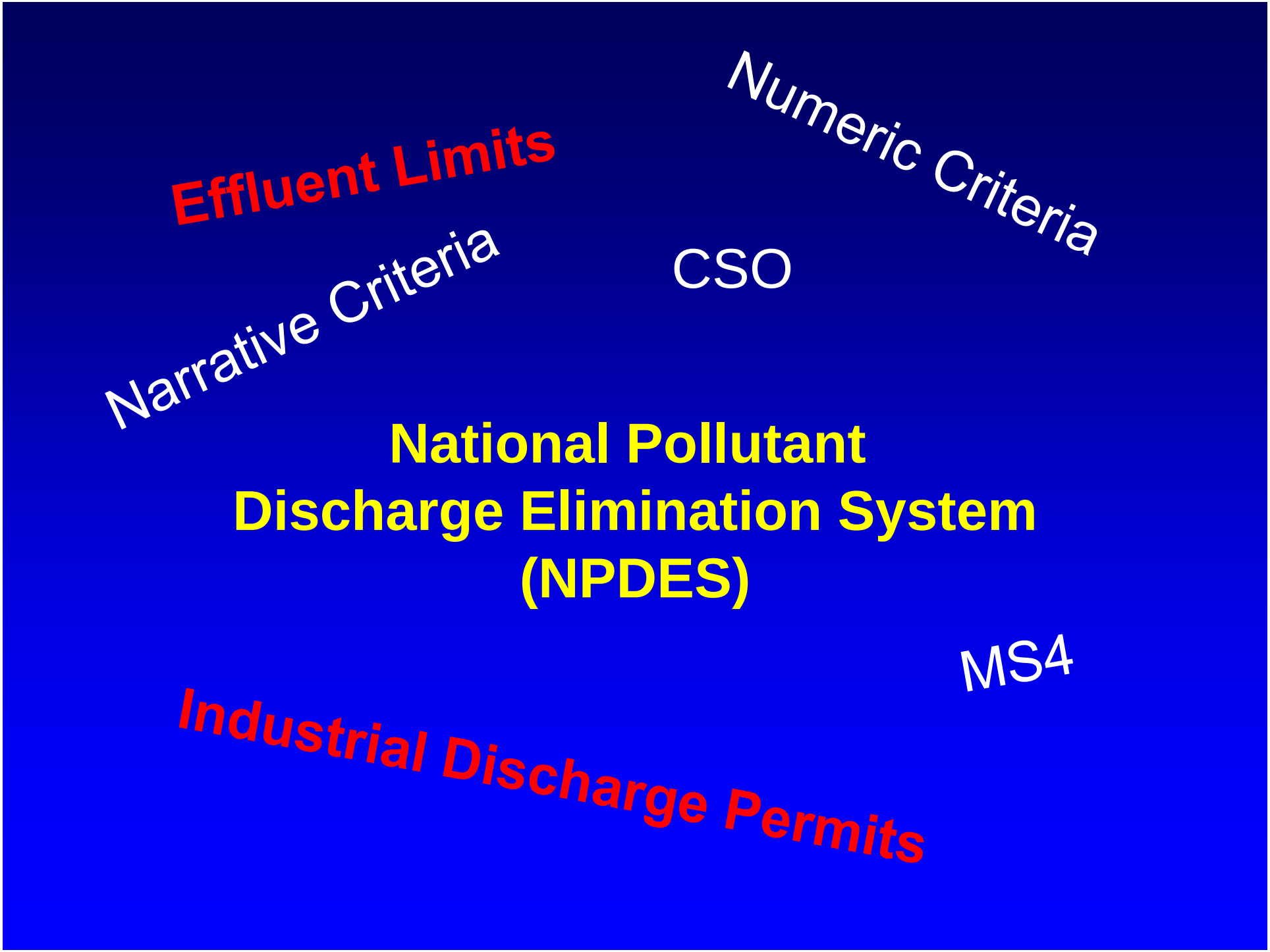
Portable Dewatering Solutions

Turbid Discharge = Violation?

Dewatering Violations

Turbid Discharge = Violation?


Effluent Limits
Numeric Criteria
Narrative Criteria
CSO
National Pollutant
Discharge Elimination System
(NPDES)
MS4
Industrial Discharge Permits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NSPS

PSNS

BAT

National Pollutant Discharge Elimination System (NPDES)

BPT

BCT

PSES

Best Available Technology (BAT)

"*a level of technology based on the very best (State of the art) control and treatment measures that have been developed or are capable of being developed and that are economically achievable within the appropriate industrial category*."

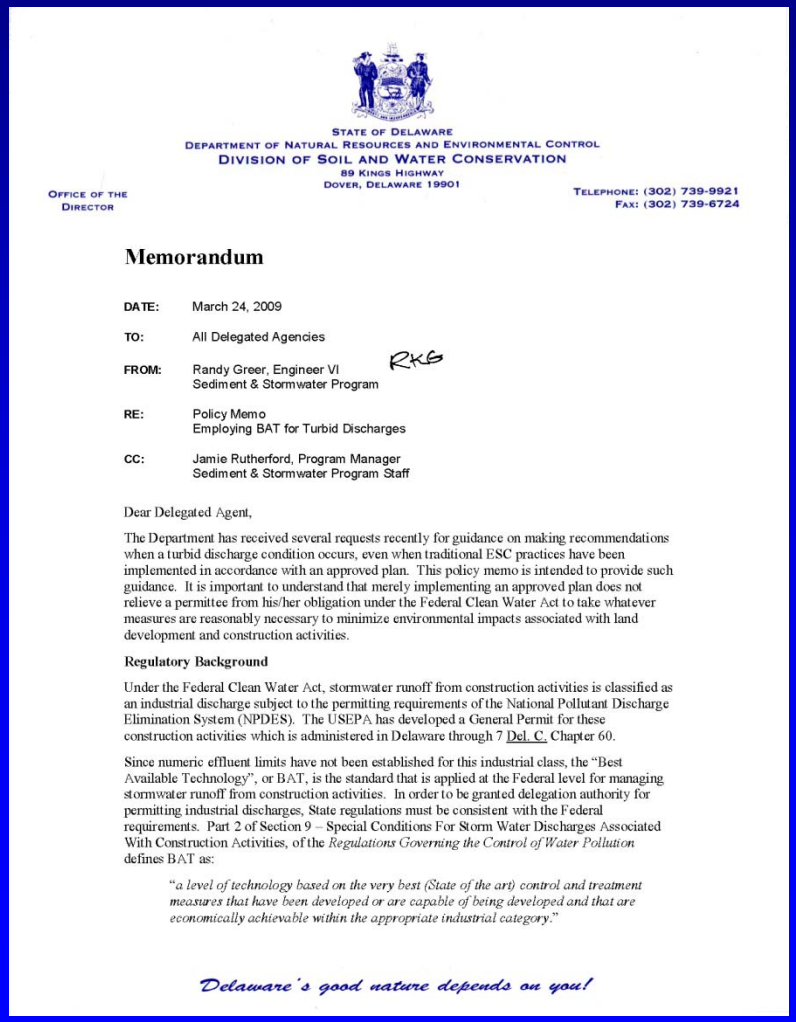
Part 2, Section 9, Chapter 60, Title 7, Del. Code

Best Available Technology (BAT)

"*a level of technology based on the very best* ***(State of the art)*** *control and treatment measures that have been developed or are capable of being developed and that are* ***economically achievable*** *within the appropriate industrial category*."

Part 2, Section 9, Chapter 60, Title 7, Del. Code

DNREC Policy on Turbid Discharges



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
DIVISION OF SOIL AND WATER CONSERVATION
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

OFFICE OF THE DIRECTOR

TELEPHONE: (302) 739-9921
FAX: (302) 739-6724

Memorandum

DATE: March 24, 2009

TO: All Delegated Agencies

FROM: Randy Greer, Engineer VI RKG
Sediment & Stormwater Program

RE: Policy Memo
Employing BAT for Turbid Discharges

CC: Jamie Rutherford, Program Manager
Sediment & Stormwater Program Staff

Dear Delegated Agent,

The Department has received several requests recently for guidance on making recommendations when a turbid discharge condition occurs, even when traditional ESC practices have been implemented in accordance with an approved plan. This policy memo is intended to provide such guidance. It is important to understand that merely implementing an approved plan does not relieve a permittee from his/her obligation under the Federal Clean Water Act to take whatever measures are reasonably necessary to minimize environmental impacts associated with land development and construction activities.

Regulatory Background

Under the Federal Clean Water Act, stormwater runoff from construction activities is classified as an industrial discharge subject to the permitting requirements of the National Pollutant Discharge Elimination System (NPDES). The USEPA has developed a General Permit for these construction activities which is administered in Delaware through 7 Del. C. Chapter 60.

Since numeric effluent limits have not been established for this industrial class, the "Best Available Technology", or BAT, is the standard that is applied at the Federal level for managing stormwater runoff from construction activities. In order to be granted delegation authority for permitting industrial discharges, State regulations must be consistent with the Federal requirements. Part 2 of Section 9 – Special Conditions For Storm Water Discharges Associated With Construction Activities, of the *Regulations Governing the Control of Water Pollution* defines BAT as:

> *"a level of technology based on the very best (State of the art) control and treatment measures that have been developed or are capable of being developed and that are economically achievable within the appropriate industrial category."*

Delaware's good nature depends on you!

- Regulatory Background
- Requirement to employ Best Available Technology (BAT)
- Authority to require amended plan
- Procedural guidance

Possible Options for Achieving BAT

On-Site Re-Use

On-Site Filtration Systems

Chemical Flocculants

STANDARD AND SPECIFICATIONS FOR FLOCCULATION

Definition: The process by which small particles of fine soils and sediments are induced to aggregate into larger lumps through the application of a chemical agent.

Purpose: To protect streams from the impact of turbid stormwater discharges, especially when construction continues in wet weather conditions. Traditional soil erosion and sediment control practices may not be adequate to control fine particles suspended in runoff, such as clay and fine silt. Chemical treatment can reduce turbidities to levels comparable to dry weather stream flows.

Conditions Where Practice Applies

Flocculation should only be employed when traditional "first line of defense" practices, such as vegetative stabilization, sediment traps, etc. are ineffective and/or additional treatment of stormwater runoff from a disturbed area is warranted. Turbidity is difficult to control once fine particles are suspended in stormwater runoff from construction sites. Flocculation of runoff after settling larger particulate matter in a sediment pond or other practice is an effective turbidity control if the treatment system is properly designed and implemented. Care must be taken to ensure that chemically treated stormwater discharged from construction sites is nontoxic to aquatic organisms and does not violate applicable State or Federal regulations.

Design Considerations

The design and operation of a flocculation system should take into consideration the factors that determine optimum, cost-effective performance, while ensuring non-toxic discharges.

I. Product Evaluation

a. Treatment chemicals must be approved by EPA for potable water use.
b. Petroleum-based polymers are prohibited.
c. The approval of a treatment chemical shall be conditional, subject to monitoring of treated stormwater at the subject construction site.
d. Authorization to use a chemical in the field does not relieve the applicant from responsibility for meeting all discharge and receiving water criteria applicable to a site.

Chemical Flocculants

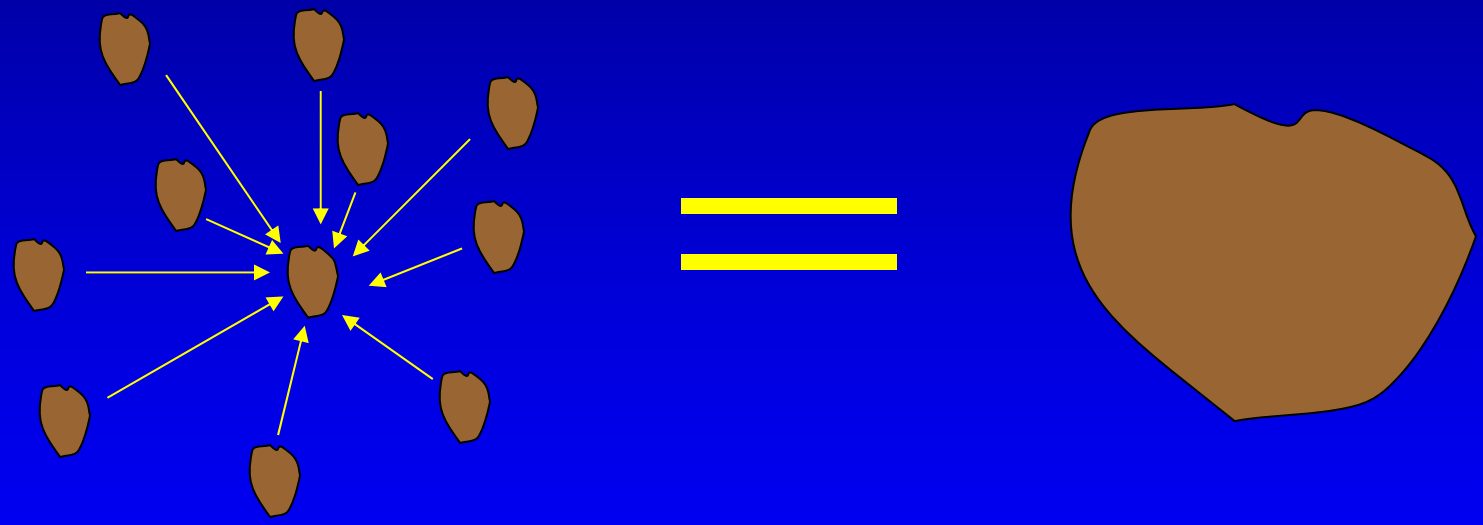
- Aluminum Sulfate (ALUM)
- Sodium Aluminate
- Ferric Aluminum Sulfate
- Gypsum
- Chitosan
- Polyacrylamide (PAM)

Chemical Flocculants

- Aluminum Sulfate (ALUM)
- Sodium Aluminate
- Ferric Aluminum Sulfate
- Gypsum
- Chitosan
- **Polyacrylamide (PAM)**

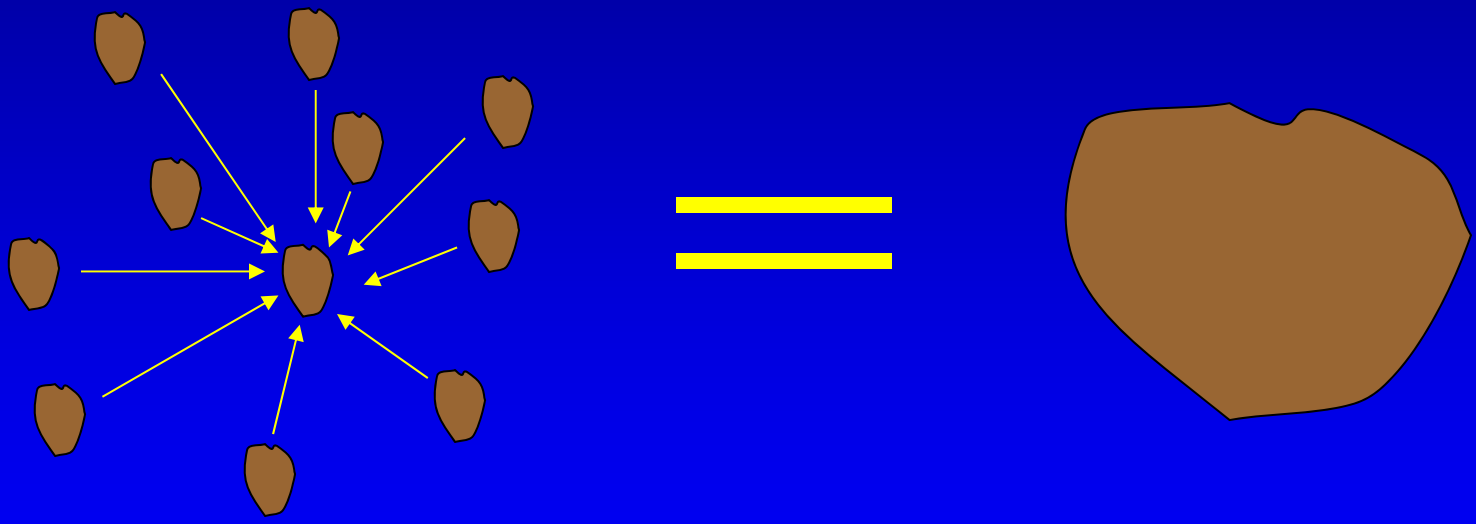
PAM polymers interact predominantly with the clay and fine fractions of soils

PAM creates an electro-chemical reaction that induces these fine soil particles to cluster together



Clustered particles are more resistant to erosive forces and aid in deposition

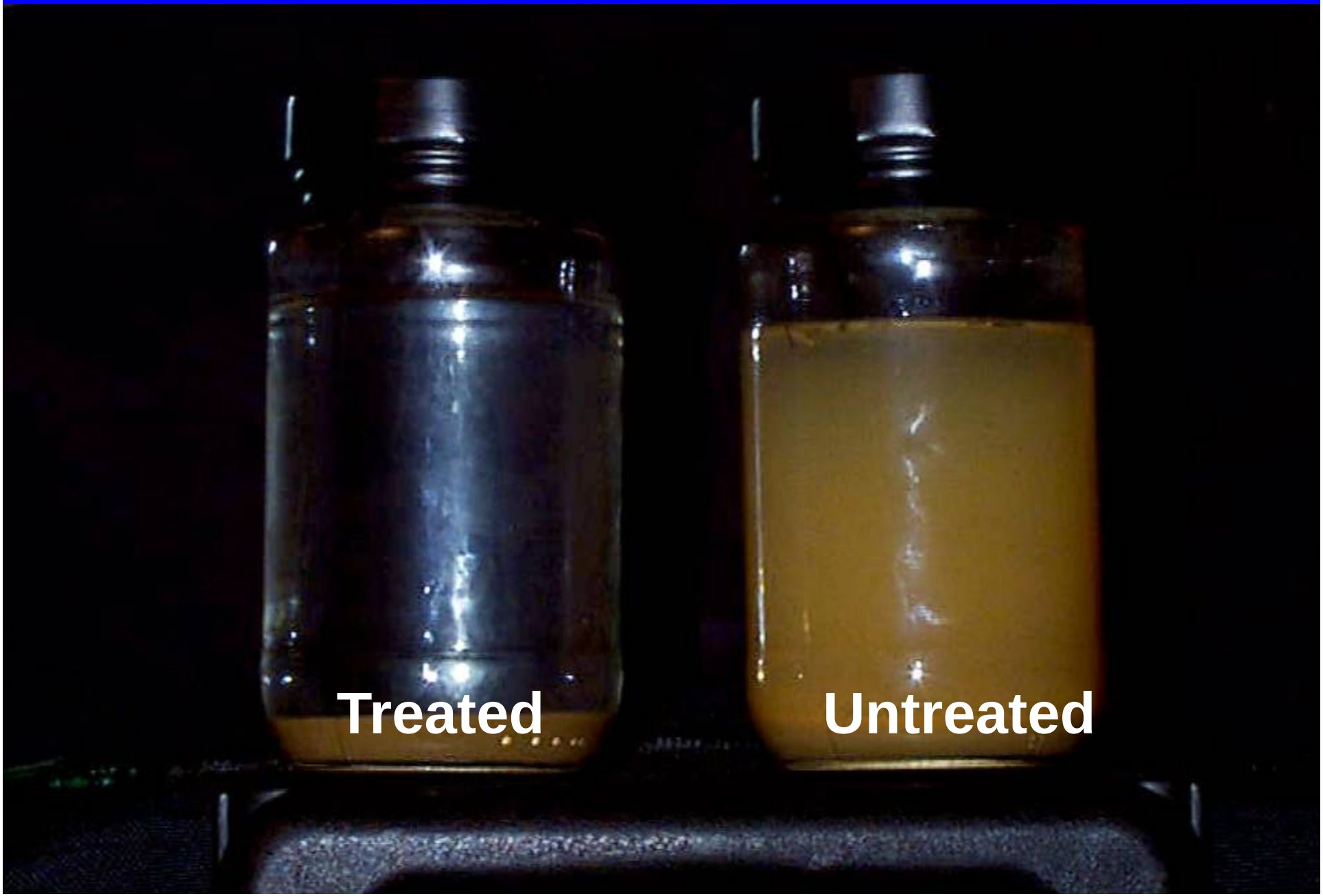
One size does not fit all!



Site specific soil analysis to ensure proper selection and maximum performance of PAM is available.

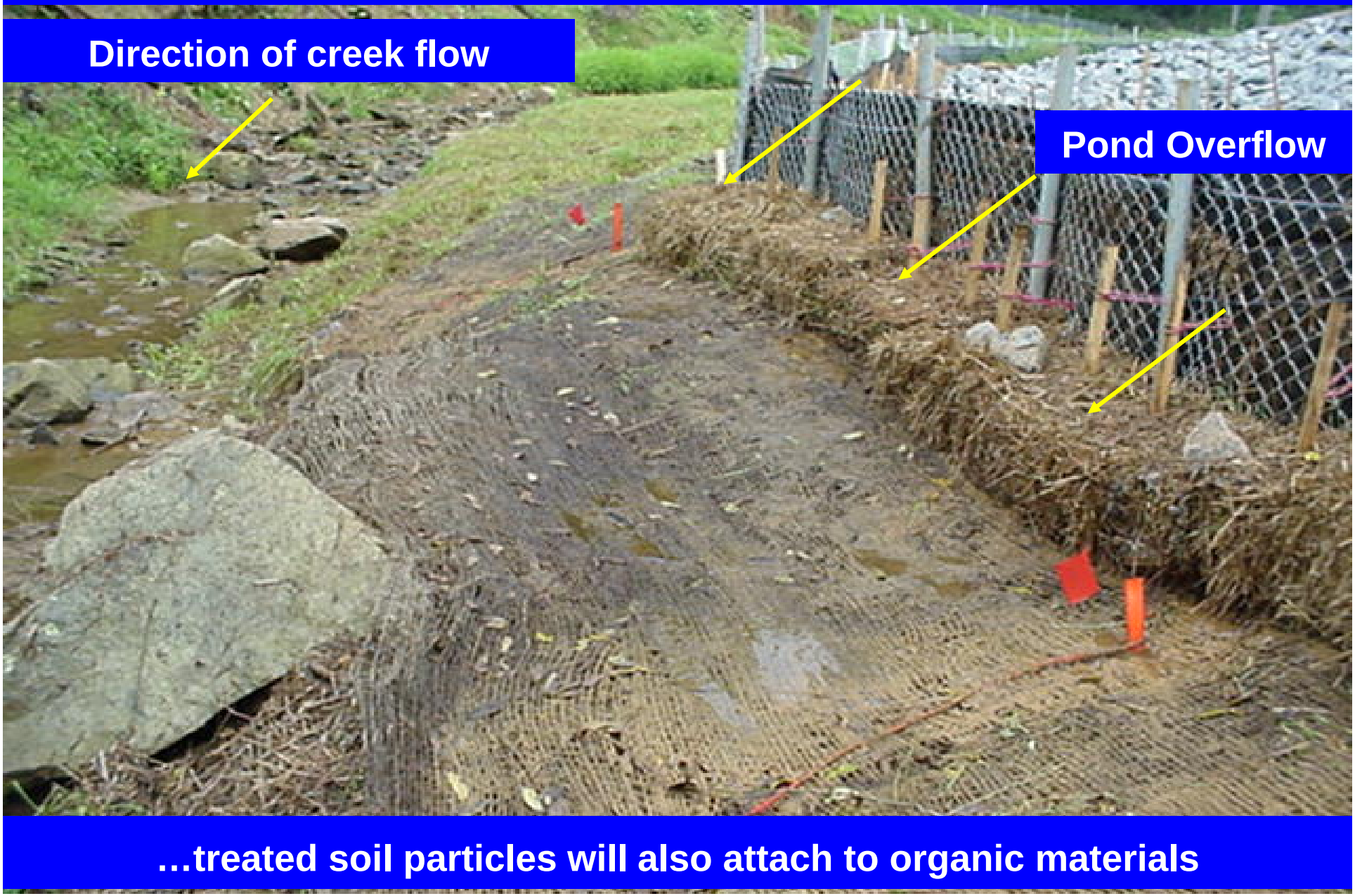
Immediately after mixing

10 hours after mixing



Disturbed soil treated with PAM

Organic materials, such as the Jute matting used here, can be used to filter out and retain treated soil particles because…



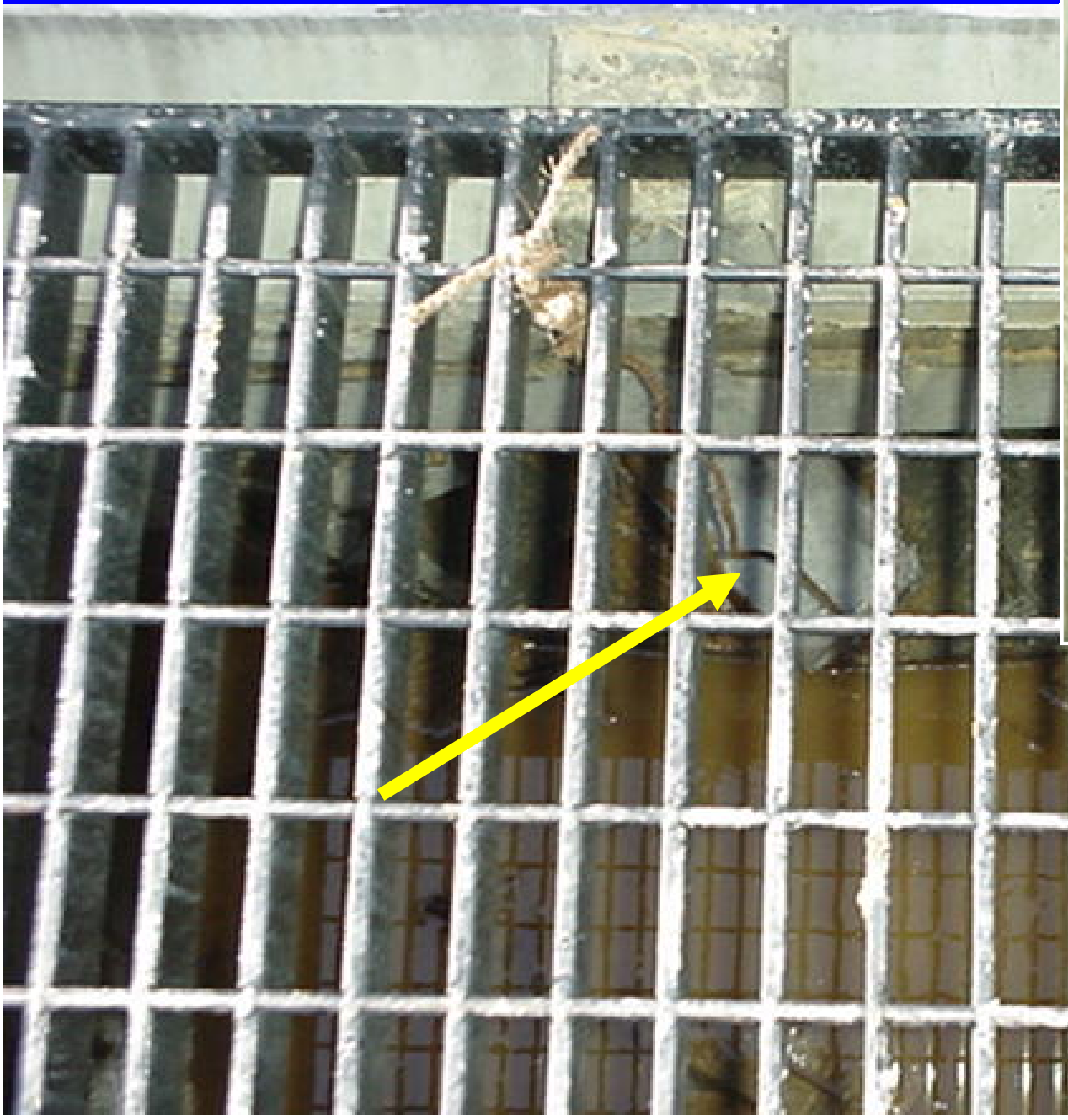
…treated soil particles will also attach to organic materials

PAM powder and/or emulsion application may not always be 100% effective in preventing soil particle movement, especially in the case of less frequent, more extreme rain events.

PAM is also available as a semi-hydrated gel block that, when placed within storm water or construction site runoff, will remove fine particles and reduce Nephelometric Turbidity Unit (NTU) values.

The gel blocks can be tied to a stake in an open channel, or…

….tied to a grate in drainage pipe



PAM Systems Approach

Collection Swale Liners

Particle Curtains

"Catcher Mitts"

Recirculation Considerations

John Easom

Territory Sales Manager
ACF Environmental

Cell: 302-420-0009

DNREC BAT Policy Procedural Guidelines

- The CCR and/or agency site reviewer shall prepare an inspection report documenting the turbid discharge.
- Whenever possible, the inspection report should be supported with photographic evidence, both on-site and off-site as applicable, of this discharge.
- The inspection report shall state that the plan must employ BAT to address the turbid discharge condition. This may be addressed initially with appropriate field changes to the plan.
- If previous attempts to control a turbidity problem through field changes have not been successful, the inspection report shall state that the owner must submit a revised plan to address the turbid discharge condition, along with a reasonable time limit to make such revision.
- If the plan is not revised within the allowable time frame and continues to discharge turbid water, the site will be considered in violation.

Questions?