Seattle Public Utilities

PNWS-AWWA PRESENTATION

May 9, 2013

Spokane, Washington

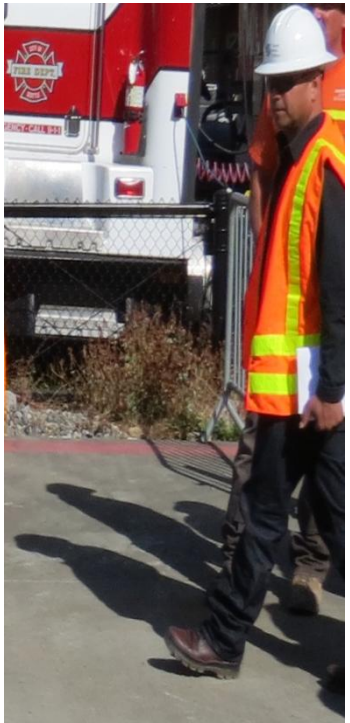
Water Operations
Stormwater Best Management Practices

Presenters

David Owens- Senior Water Pipe Worker; Certified Erosion and Sediment Control Lead (CESCL)

Shab Zand- Senior Environmental Analyst

Walter Vining- Senior Capital Project Coordinator



How many in the audience have implemented “mobile” Stormwater Best Management Practices (BMPs) in the field?

Why we are here…..

- SPU Water Operations was faced with the challenge of NPDES Compliance
- Dual and Competing needs:
  - Flush hydrants to maintain drinking water quality, but control discharges to protect stormwater quality
  - Repair watermain breaks to restore water service, yet reduce impacts and damage to the environment
- Didn't find canned BMP training and SOPs targeted specifically to the Water Utility O&M work
- So, we developed it in-house and wanted to share our learnings with you….

An Overview
Shab Zand

Stormwater Regulations

Stormwater Regulations

- Federal Clean Water Act

  The primary federal law governing water pollution enacted in 1972 with the goal of eliminating toxic substance releases into water and ensuring that surface waters would meet standards necessary for human sports and recreation.

- Washington State NPDES Per

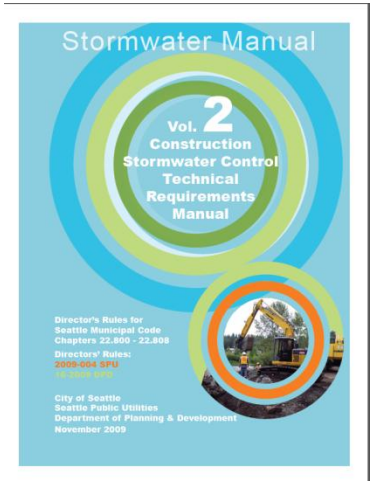
  The National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permits cover discharges from municipal separate storm sewer systems (MS4s). The Phase I Municipal Stormwater Permit issued by Ecology regulates the discharges from MS4s owned or operated the City of Seattle.

Stormwater Code

- Seattle's stormwater regulations are written to satisfy the City's obligation to enact regulations to comply with our NPDES Permit, issued by Ecology.

Seattle's Stormwater Code

Dirt is a pollutant
Chemicals are a pollutant
Nothing But Rain Down The Drain



Stormwater Directors Rules

Construction Methods
Source Control Required Best Management Practices (BMPs)

Stormwater Ordinance

Council Bill Number: 116614
Ordinance Number: 123105

- Protecting Seattle's waterways is a cen[illegible] Mayor's Restore Our Waters strategy, the City of Seattle Comprehensive Plan, and SPU Comprehensive Drainage Plan

- Drainage rate customers from the city ranked "improvement in water quality in lakes and streams" as the most important drainage investment.

Restoring Our Wate

- Seattle's lakes, urban creek watersheds, the Duwa[illegible] and Puget Sound are essential elements of our community's character.

- We need to reduce our impact: slow the flow of stormwater runoff (let as much as possible soak in naturally), prevent pollution (control turbidity, fix leaks and respond to spills, manage use of chemicals), and restore habitat.

- About 75% of the toxic chemicals that get into Puget Sound are from stormwater run-off that runs off our streets, buildings and homes.

Three types of Stormwater Drainage systems in Seattle:

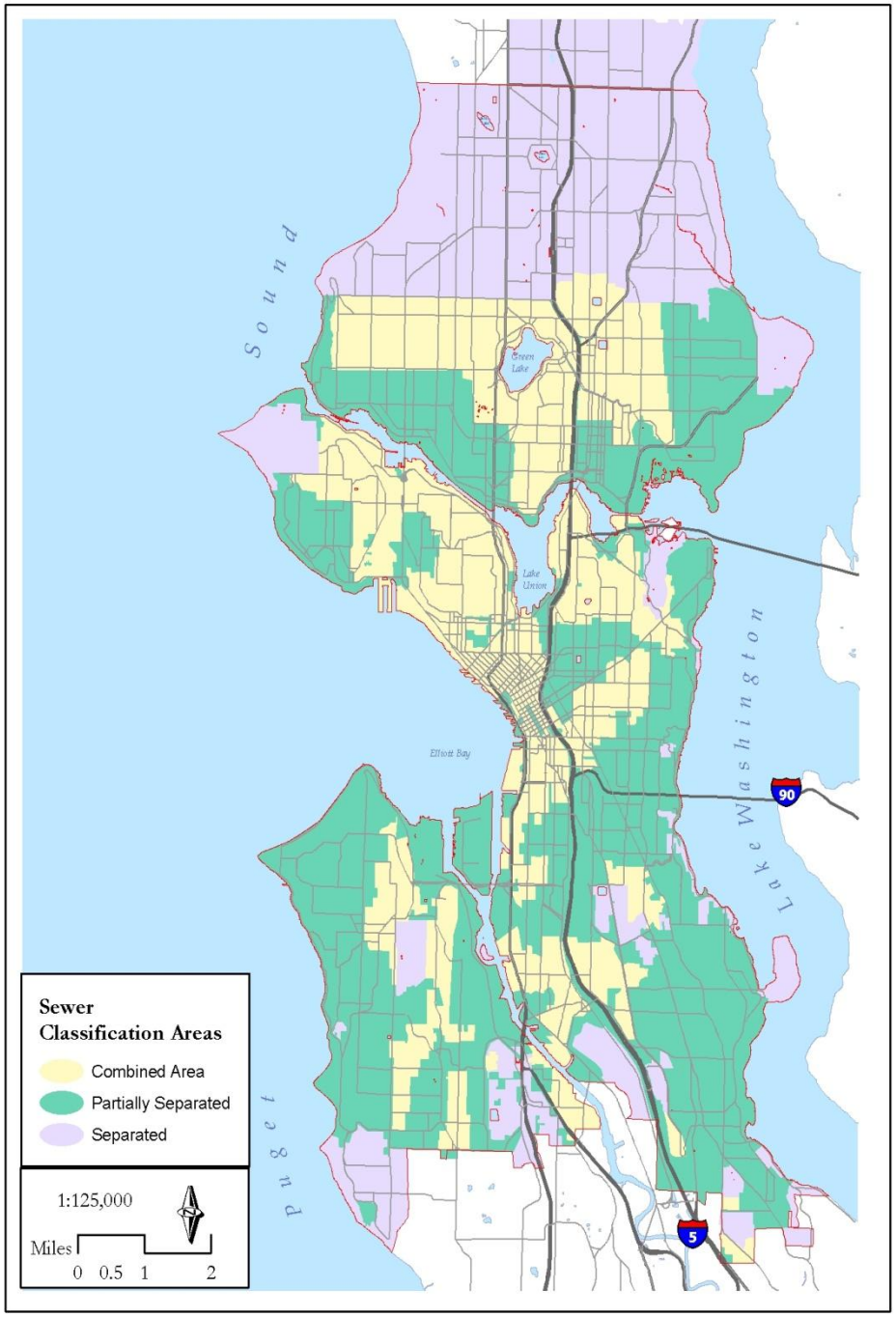
1. Ditch and Culvert (purple)

2. Public Storm Drain (green)

3. Public Combined Sewer (yellow)

Stormwater Permit

applies to types 1 & 2



Controlling Runoff at Construction Sites

The NPDES Permit, the Seattle Stormwater Code (SMC 22.800-22.808) and SPU Directors' Rules regulate construction and maintenance activities, including **O&M activities performed by Water & Drainage /Wastewater**. The following actions are required:

1. **<u>Every employee</u> is expected to implement BMPs to prevent pollution from entering the drainage system during field work.**
2. **BMPs must begin as close to the source as possible and extend as far as needed to control pollutant discharges**;
3. **Report any uncontrolled and untreated water discharges** into the stormwater system (type 1 & 2 systems).

Main Pollutants in Water Operations:

- Sediment
- Chlorine

What's Wrong With a Little Dirt In The Drain?

- The drains lead to waterways
- Sediment reduces photosynthesis and decrease food supply.
- Increases nutrient levels, lowering oxygen.
- Releases and transports pollutants trapped in soil.
- Clogs fish gills (like breathing smoke).
- Buries fish eggs and fish fry.

What's Wrong With a Little Dirt In The Drain?

- **1/8th of an inch of soil over an area** of one acre results in the transportation of **16.8 cubic yards of soil**.

How much sediment could SPU discharge from water pipe Leaks in a year?

Any guesses?

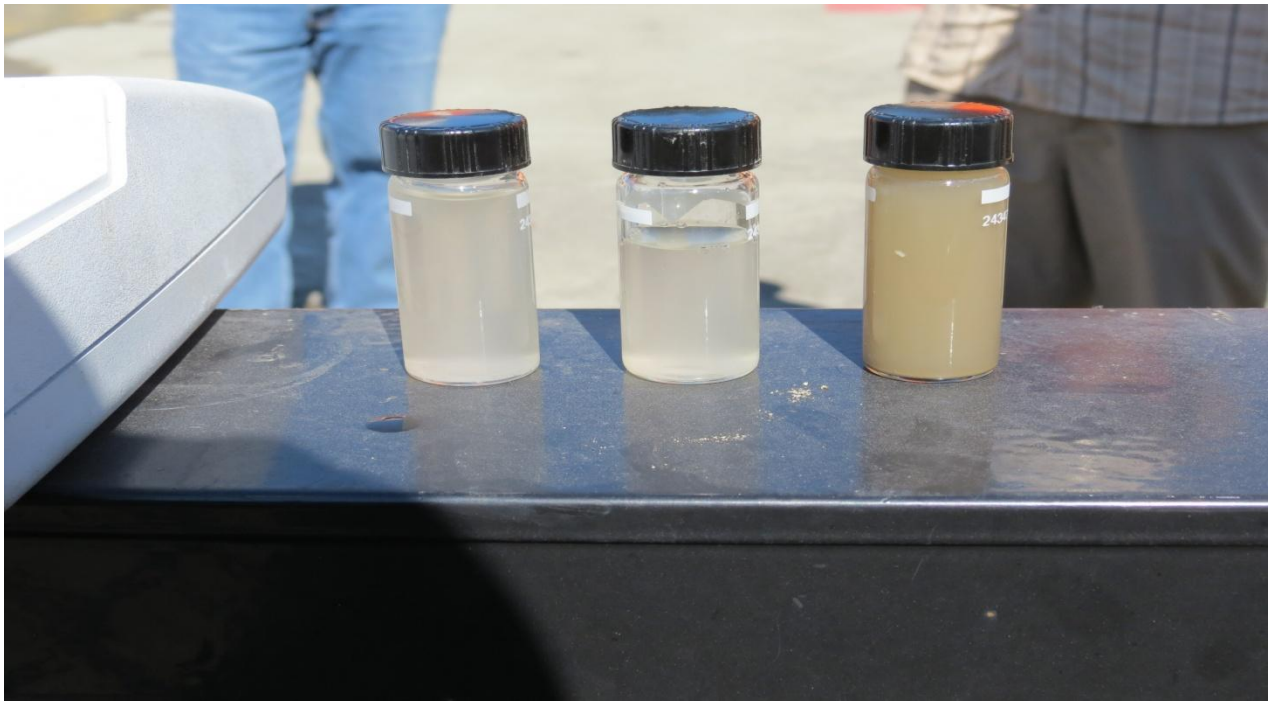
Over 30, 5-Yard Dump Trucks Potentially Going Into Local Waterways Per Year

Sediment Control

- Turbidity: dirt in water

What are the Rules About Dirt (Turbidity)

- Turbidity - *not to exceed 5 (NTU) over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when background turbidity is more than 50 NTU. If background cannot be established, it is considered to be* ***25 NTU****.*



What About Emergencies!?

- System emergencies such as water main breaks are considered a violation of the permit. We can still get a fine from Ecology if we don't take steps to mitigate the impacts.
- There is no "free pass" for emergencies – we must take action as soon as practicable (not "when convenient.")

Chlorine/Dewatering Regulations

- SMC 22.802.030 - *Discharges from potable water sources, including flushing of potable water lines, hyperchlorinated water line flushing, fire hydrant system flushing, and pipeline hydrostatic test water. Planned discharges shall be de-chlorinated to a concentration of* ***0.1 ppm or less****,*

  pH-adjusted if necessary, and volumetrically and velocity controlled to prevent resuspension of sediments in the drainage system;

I drink it. It can’t be that bad!

Species	Chlorine Level	Time L/C 50
Pacific Oyster	.63ppm	1 hour
Algal	.5 – 1ppm	1 hour (Population)
Blue Crab	.75ppm	48 hour
Brook Trout	.1 - <.2	96 hour
Rainbow Trout	.029	96 hour

SPU's APPROACH TO THIS PROGRAM

Walter Vining

But, before we get started, any guesses on how many miles of water pipe in SPU's Water System?

SPU Field Operations & Maintenance Background

WATER OPERATIONS

1,830 mile water system serving approximately 1.3 million retail and wholesale customers

- 27 Service Trucks
- 5 First Response Crews
- 120 Crew Members

DRAINAGE & WASTEWATER

2,020 mile drainage and wastewater system serving approximately 700,000 retail customers

- ____Service Trucks
- ____ First Response Crews
- ____ Crew Members

SOLID WASTE

800,000 tons of solid waste is collected and disposed of annually

EPA Audit and past NOVs- driving force

Senior Top Management Buy-in- Required

BMP Manual- living document- making sure the protocols are field tested and effective

Team up with the regulators-

Training- ***Train-the-trainer-*** train all field staff including management by providing hands-on training and refreshers on field application of bmps

Supplies- Inventory existing supplies and order what's needed to outfit each truck (with kits) and stock the Warehouse

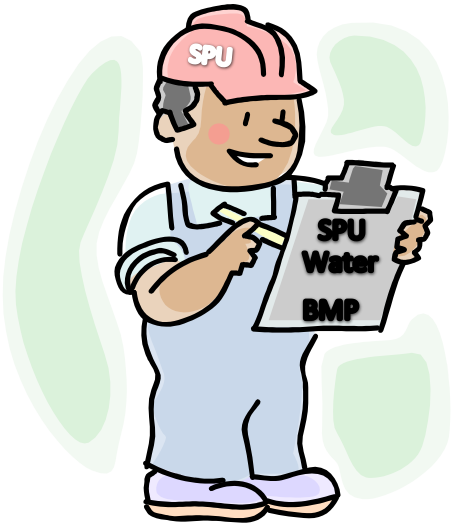
Reporting and documentation- Implement a reporting and documentation system

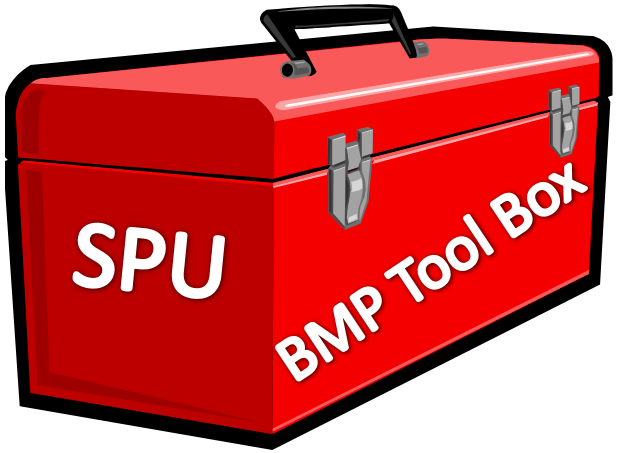
Review periodically- Conduct spot checks, gather crew feedback, report to management , course correct as needed, offer annual refreshers.

Water Operations BMP Implementation PLAN:

How Do We Stop Pollutants From Entering the Stormwater System?

- Best Management Practices (BMPs) - A combination of equipment, procedures and actions that are used to control water pollution.
  - Sediment and Erosion Control BMPs
  - Dechlorination BMPs

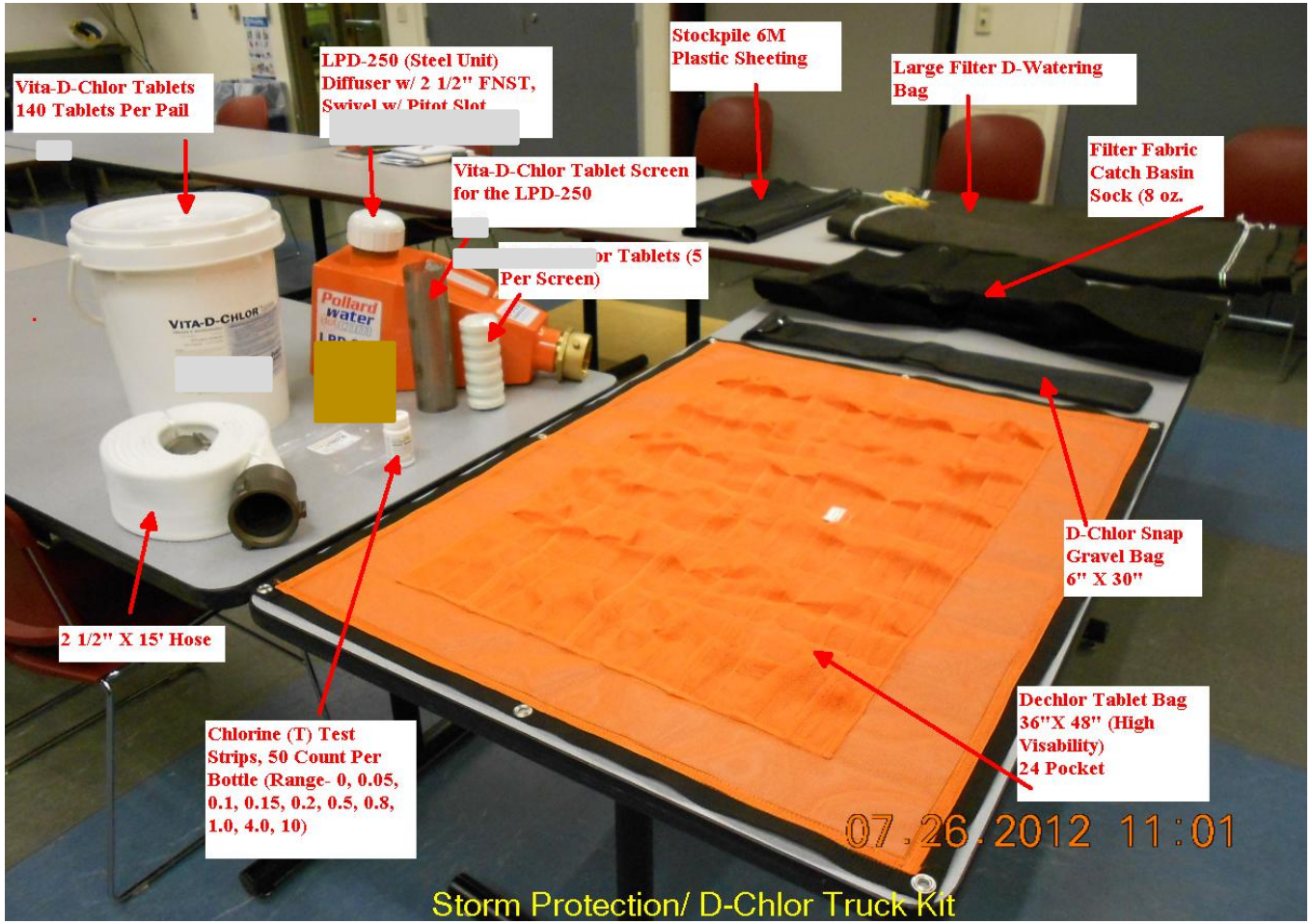




What are BMPs

- Best Management Practices: activities, prohibitions of practices, maintenance procedures, training and practices to control job site run off and prevent/reduce the

BMP Supplies Research and Testing



Materials Issued to Each Crew

BMP KIT

REPORTING STICKER

BMPs from a field perspective

David Owens

Who can name the first Source Control BMP in Water Ops?

Valve Keys

- Used to control the flow of water causing erosion control
- Already being used during main breaks
- Can cause low pressure and back flow issues
- Not feasible for most service repairs

Plastic/Visquene

- Can be used in multiple applications to prevent water contact with soil
  - Cover Stockpiles
  - Line ditches
- Can create a good well point in ditch and prevents solids from entering the pumps.
- Cheap and disposable
- Can be difficult to secure in place (wind)
- Can become a slip hazard in ditches
- Only used temporarily

Pumps

- Used to dewater excavations and maintain a non-flooded work space
- Can be used to direct water to vegetated areas, sanitary sewers and areas where sediment control is more feasible
- Can be the source of

Dewatering Filter Bags

- Cannot be the only BMP.
- Acts as a good filter for medium to large particulates
- Easy to use
- Cheap and disposable
- Poor filter for clay
- Can be heavy when full
- Best used in vegetated area

Vegetation

- Nature’s way of controlling sediment
- Great to use in conjunction with dewatering bags
- Can be easily filled with sediment overloading
- Often Private Property
- Not allowable in sensitive areas like steep slopes, wetlands, natural areas or other buffer areas.

Gravel

- Used to direct water
- Used to filter water if filled with washed sand/rock
- Used to hold plastic in-place
- Can be used as check dams to allow time for settling
- Cheap and easy to dispose of
- Heavy- not easy to keep on the trucks

Bio (wood Chip) Bags

- Used for filtration and flow control to allow solids to settle
- Versatile and easily adaptive for additional BMPs
- Cheap and reusable
- Bulky and hard to store

Sediment and Erosion Control BMPs

- What Do They Do
  - Filters Water
  - Controls Run-on & Run-off
  - Settles Solids
  - Contains Contamination
  - Re-directs pollution
  - Prevents Soil Contact
  - Allows Infiltration

Catch Basin Filters

- Must be used on all construction projects (inspectors first stop)
- Last line of defense
- Removes medium to large material
- Prevents or reduces CB maintenance at end of project
- Cheap and disposable
- Can become heavy
- Can drop into the CB lid if not removed properly
- Can cause street flooding if not removed/maintained

SPU Solution to Mobile Catch Basin protection

Vactor Truck

- Used to hydro-excavate and control water in the trench simultaneously
- Great tool to get to the repair point
- Great tool to be used down grade of the project and collect water
- Fills quickly
- Only two available at this time
- Expensive to own and

Sanitary Sewer System

- Minimum BMPs required
- They are often near drainage system
- Can cause sewer overflows and private property damage if system is surcharged

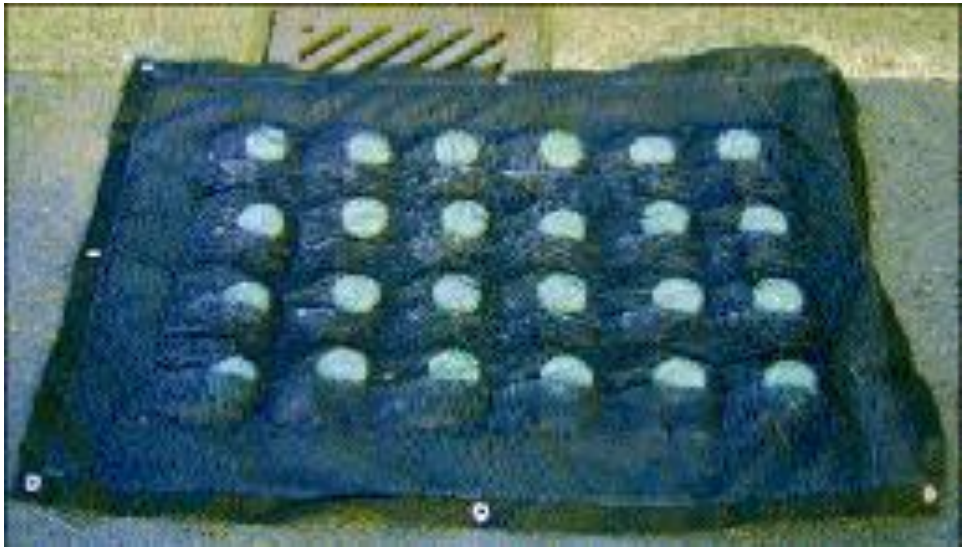
Dechlorination

Dechlorination Chemicals

- Intended to dechlorinate when contacting water
- SPU uses Ascorbic Acid is also known as vitamin C
- Has a neutral pH of 7.8
- One tablet will neutralize 16,000 gallons of water (@1 ppm).

Dechlorination Pad

- Placed over CBs or in line of water to maximize water contact with tablets.
- Can be hung in large catch basins.
- Require monitoring but are easy to see when they are getting low



Dechlorination Attachment
Owens Dechlor-Stick

- Installs in discharge bag
- Simple to use
- Holds down discharge hose
- Hard to see tablets and requires additional testing

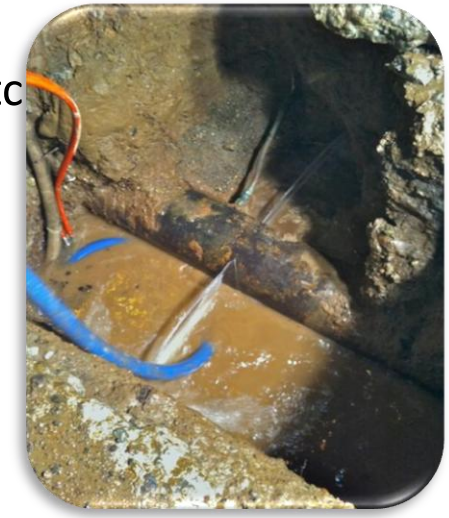
Dechlorination Diffuser

- Diffuses flow while dechlorinating
- Connects to fire hose or hydrant
- Flow measurement pito tube

Operational BMP Manual

- **Unplanned Release**
  - Ensure worker safety, public safety, and private property protections.
  - Evaluate release volume and character.
  - Identify release point and conveyance to determine appropriate BMP use.
  - Deploy BMP as soon as feasible
  - Report release to ORC

- **Planned Release**
  - Storm drain Protection
  - Sediment Control
  - Dechlorination
  - Stock Pile Storage
  - Saw Cutting
  - Hydrant and line flushing
  - Sweeping
  - Lining excavation with Plastic
  - Permits, Plans, etc



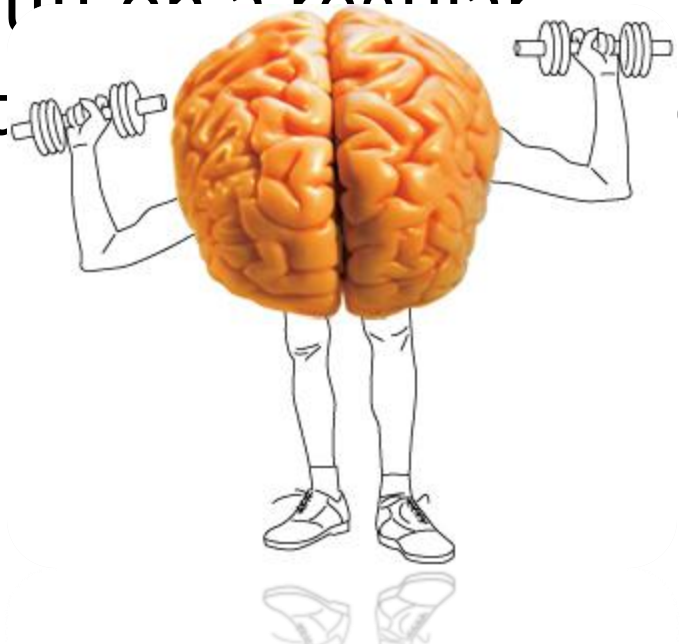
New Technology

- New BMPs will be evaluated as they come online and integrated into the SPU warehouse supplies.

Message to the crews: Think About Your Options

- Every site is different you will need to look at all of your tools and make a good decision on what to use.

- You are dealing with this stuff on a regular basis you are empowered t… better or additional BMPs



“BMPs save time in clean-up and in turn save money”

Dave Owens

EPA Audit

- EPA will be visiting Seattle and we hope to be ready
- Focus on
  - Construction Activities
  - Procedures
  - Training
  - Non Management Staff
  - Code Enforcement

What's next?

- Interested in growing this program
- Looking to develop a standard training module which can be offered to the PNWS community
- We have developed a foundation course along with a video which can be further improved and offered to those in need of the tra
  CEUs)
- Looking for other entities to parti
  this unique training to the next le
- If interested, please contact us.

QUESTIONS & DISCUSSION

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