BUILDING A WORLD OF DIFFERENCE

Wet-Weather Flows Certainly Have Some Different Characters

- Steve arant and Jim Fitzpatrick

Thank You, Thank You, Thank You!!

Our Water ... Our Future
PROTECTING THE MIGHTY MISSOURI
ST. JOSEPH, MO

METROPOLITAN SEWER DISTRICT of greater CINCINNATI

SPRINGFIELD 1850 OHIO

MSD

Metropolitan St. Louis Sewer District

JCW Johnson County Wastewater

Improving Our Sewer System
Toledo Waterways Initiative

JOHNSON COUNTY ENVIRONMENTAL

City of Lawrence Department of Utilities

mmsd
Preserving The Environment • Improving Water Quality

CITY OF Salem AT YOUR SERVICE

Wet Weather Flows Certainly Have Some Different Characters

On Our Menu Today…

- How Wet-Weather Flows Are Different
- Unique Regulatory Considerations
- Treatment Solutions Tailored to The Problem

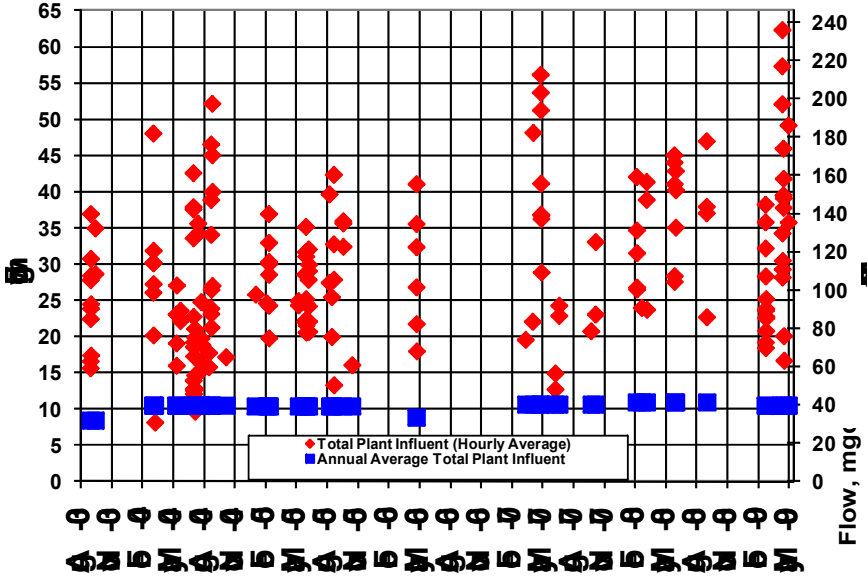
How Wet-Weather Flows Are Different

Wet Weather Flows Certainly Have Some Different Characters

Completely different set of influent characteristics and ecological concerns when streams are high

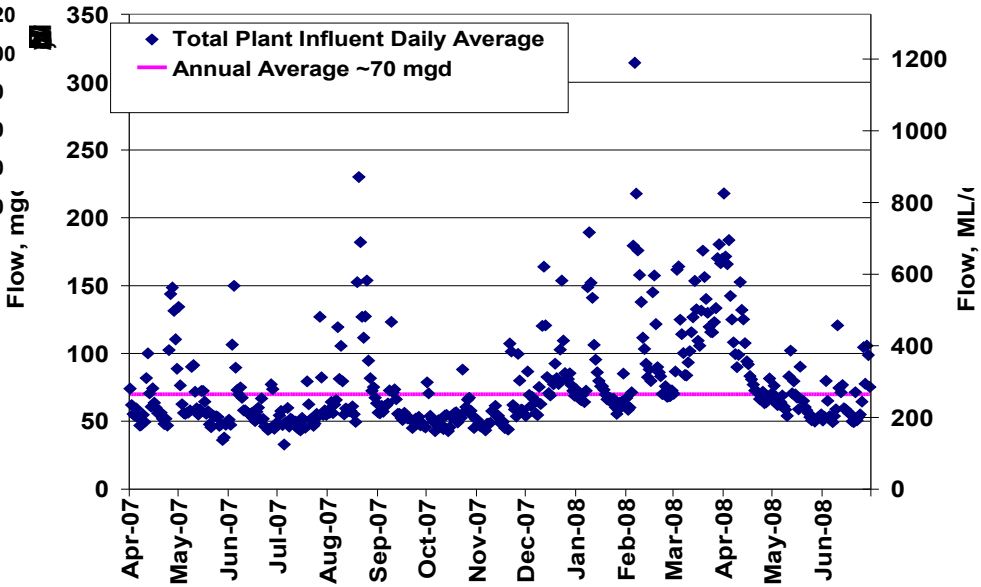
HIGHLY VARIABLE FLOW RATES…

LAWRENCE, KANSAS
WWTP WET-WEATHER INFLUENT FLOWS



- QPKHR ≈ 5 to 10 x QAA
- Similar for both CSS and SSS

TOLEDO, OHIO
BAY VIEW WWTP WET-WEATHER INFLUENT FLOWS

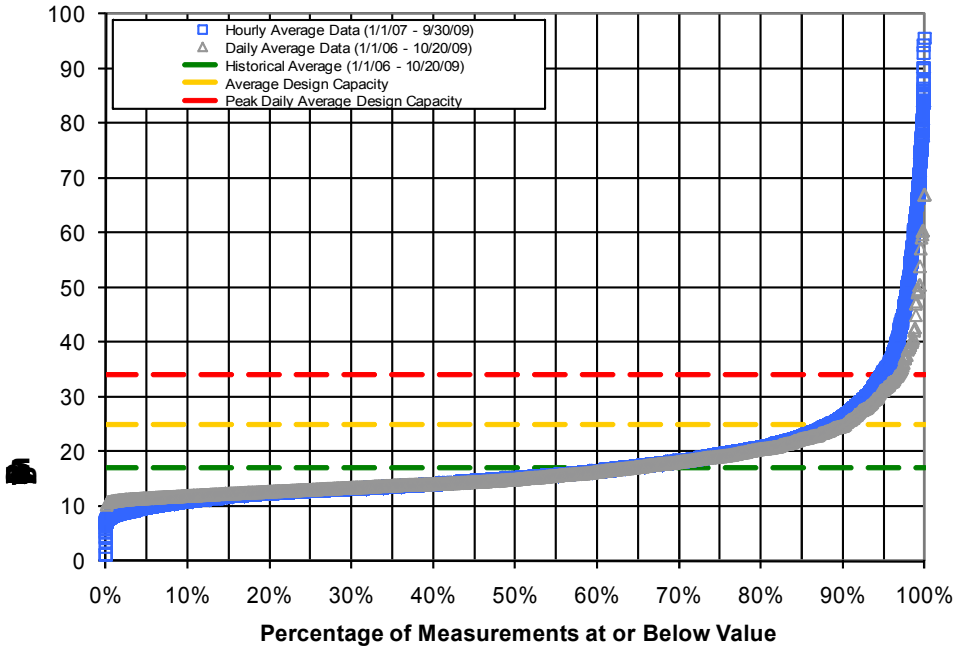


- Huge difference than peaking factors envisioned by conventional WWTP design standards (Ten States,

Wet Weather Flows Certainly Have Some Different Characters

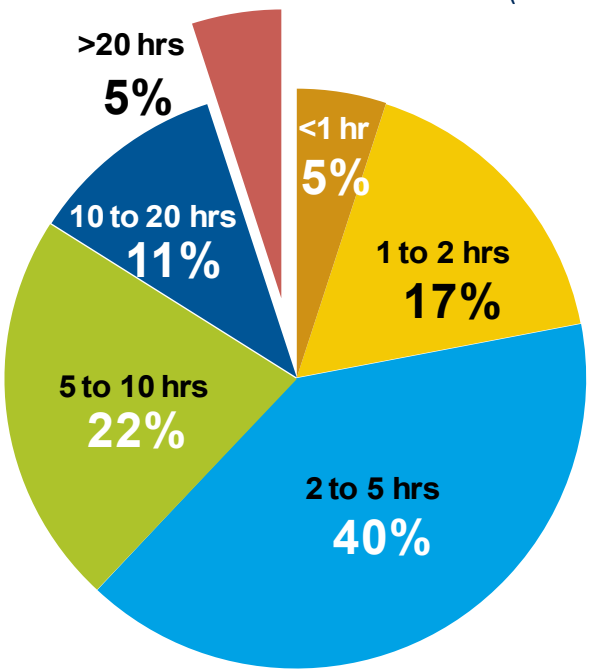
…INTERMITTENT WITH SHORT DURATION

SPRINGFIELD, OHIO WWTP
INFLUENT FLOW PROBABILITY CURVE



- QXS ~ 5% of the time
- Similar for both CSS and SSS

SPRINGFIELD, **OHIO WWTP**
BYPASS DURATIONS (2008- 2009)



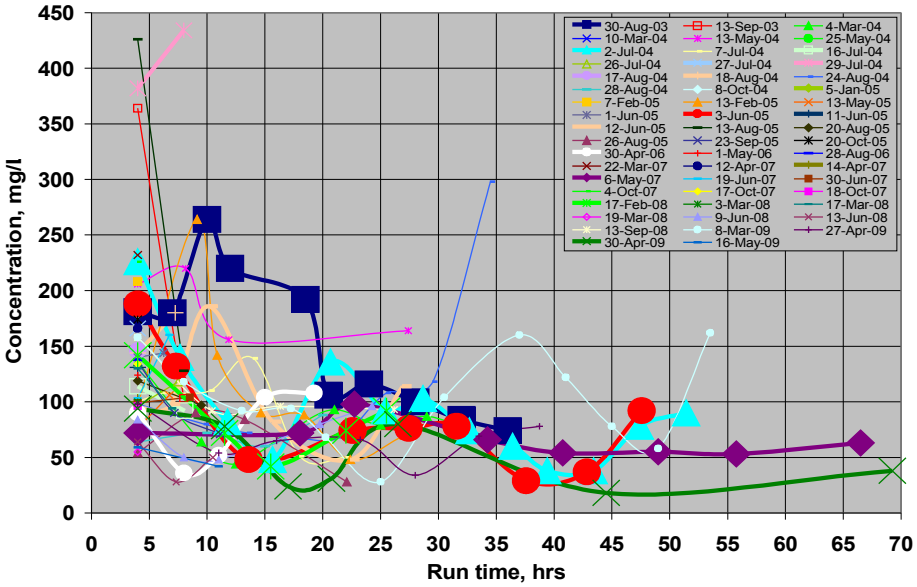
- Wet-weather flows considered “outlyer “ data in some WWTP studies

Wet Weather Flows Certainly Have Some Different Characters

Don't forget about pollutants carried with the flow

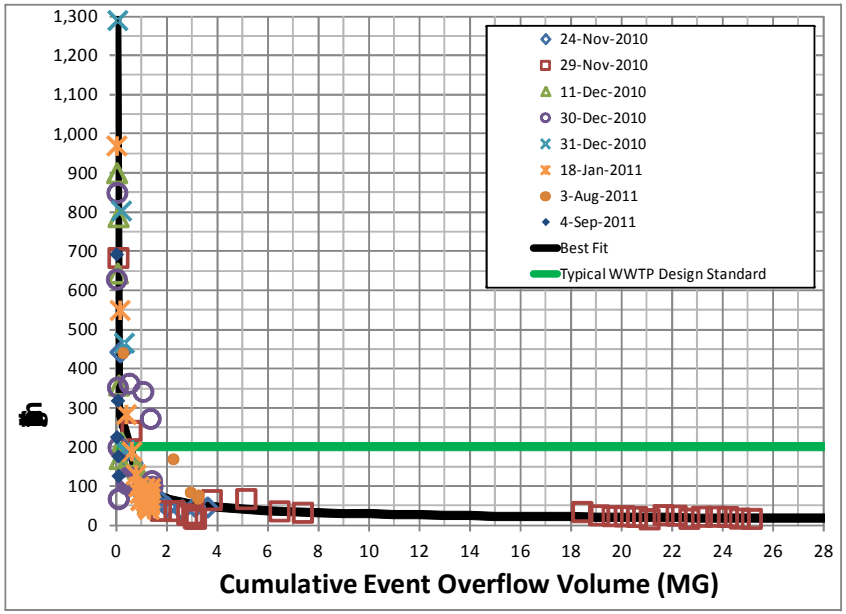
LAWRENCE, KANSAS

WET WEATHER EXCESS FLOW INFLUENT TSS



CINCINNATI, OHIO

CSO CHARACTERIZATION STUDY



- C << CAA after first flush
- Similar for both CSS and SSS

- First-flush and dilution dynamics are much different than normal conditions addressed

Wet-Weather vs. Dry-Weather Pollutants of Concern

- D.O. sags generally much less of a concern when flows are high
- Main wet-weather pollutants of concern:
  - Silt, sediments and solids. Burying eggs and larvae.
  - Biological pathogens (bacteria, etc.). Human health concern vs. aquatic toxicity concern.
  - Floatables. Trash, plastics, etc. Ingestion and entanglement by wildlife. Aesthetics.
  - Predominantly non-point sources

Wet Weather Flows Certainly Have Some Different Characters

Unique Regulatory Considerations

Existing regulations mostly aimed at dry-weather flows. Sustainable

Usepa Wet-Weather Treatment Policies are a Work-In-Progress

1994 CSO Control Policy

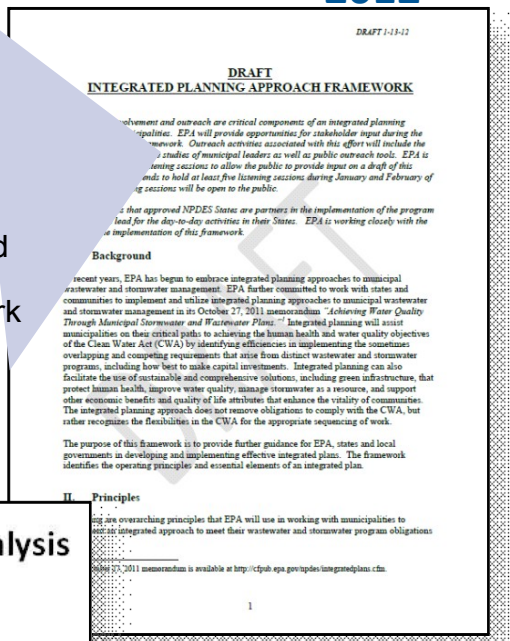
2003 **Draft** "Blending Policy"

2005 **Draft** "Peak Flows Policy"

2009 **Draft** UA Guidance

2010/2011 SSO/Peak Flows Listening Sessions and Workshops

2012 Integrated Planning Framework



DRAFT 1-13-12

DRAFT
INTEGRATED PLANNING APPROACH FRAMEWORK

...olvement and outreach are critical components of an integrated planning ...ipalities. EPA will provide opportunities for stakeholder input during the ...mework. Outreach activities associated with this effort will include the ... studies of municipal leaders as well as public outreach tools. EPA is ...ening sessions to allow the public to provide input on a draft of this ...ands to hold at least five listening sessions during January and February of ...g sessions will be open to the public.

...s that approved NPDES States are partners in the implementation of the program ...lead for the day-to-day activities in their States. EPA is working closely with the ...e implementation of this framework.

Background

...recent years, EPA has begun to embrace integrated planning approaches to municipal ...wastewater and stormwater management. EPA further committed to work with states and communities to implement and utilize integrated planning approaches to municipal wastewater and stormwater management in its October 27, 2011 memorandum *"Achieving Water Quality Through Municipal Stormwater and Wastewater Plans."* Integrated planning will assist municipalities on their critical paths to achieving the human health and water quality objectives of the Clean Water Act (CWA) by identifying efficiencies in implementing the sometimes overlapping and competing requirements that arise from distinct wastewater and stormwater programs, including how best to make capital investments. Integrated planning can also facilitate the use of sustainable and comprehensive solutions, including green infrastructure, that protect human health, improve water quality, manage stormwater as a resource, and support other economic benefits and quality of life attributes that enhance the vitality of communities. The integrated planning approach does not remove obligations to comply with the CWA, but rather recognizes the flexibilities in the CWA for the appropriate sequencing of work.

The purpose of this framework is to provide further guidance for EPA, states and local governments in developing and implementing effective integrated plans. The framework identifies the operating principles and essential elements of an integrated plan.

II. Principles

...ng are overarching principles that EPA will use in working with municipalities to ...ent an integrated approach to meet their wastewater and stormwater program obligations

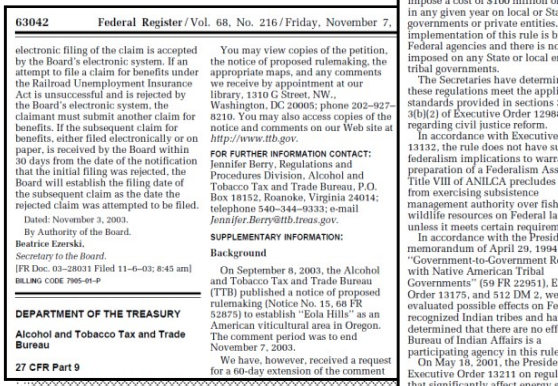
...tober 27, 2011 memorandum is available at http://cfpub.epa.gov/npdes/integratedplans.cfm.

1

Draft Guidance on Preparing a Utility Analysis

July 2009

EPA United States Environmental Protection Agency



63042 Federal Register / Vol. 68, No. 216 / Friday, November 7,

electronic filing of the claim is accepted by the Board's electronic system. If an attempt to file a claim for benefits under the Railroad Unemployment Insurance Act is unsuccessful and is rejected by the Board's electronic system, the claimant must submit another claim for benefits. If the subsequent claim for benefits, either filed electronically or on paper, is received by the Board within 30 days from the date of the notification that the initial filing was rejected, the Board will establish the filing date of the subsequent claim as the date the rejected claim was attempted to be filed.

Dated: November 3, 2003.

By Authority of the Board.

Beatrice Ezerski,

Secretary to the Board.

[FR Doc. 03–28031 Filed 11–6–03; 8:45 am]

BILLING CODE 7905–01–P

DEPARTMENT OF THE TREASURY

Alcohol and Tobacco Tax and Trade Bureau

27 CFR Part 9

You may view copies of the petition, the notice of proposed rulemaking, the appropriate maps, and any comments we receive by appointment at our library, 1310 G Street, NW., Washington, DC 20005; phone 202–927–8210. You may also access copies of the notice and comments on our Web site at *http://www.ttb.gov.*

FOR FURTHER INFORMATION CONTACT: Jennifer Berry, Regulations and Procedures Division, Alcohol and Tobacco Tax and Trade Bureau, P.O. Box 18152, Roanoke, Virginia 24014; telephone 540–344–9333; e-mail *Jennifer.Berry@ttb.treas.gov.*

SUPPLEMENTARY INFORMATION:

Background

On September 8, 2003, the Alcohol and Tobacco Tax and Trade Bureau (TTB) published a notice of proposed rulemaking (Notice No. 15, 68 FR 52875) to establish "Eola Hills" as an American viticultural area in Oregon. The comment period was to end November 7, 2003.

We have, however, received a request for a 60-day extension of the comment

Federal Register /

Title VIII of ANILCA requires the Secretaries to administer a subsisten... priority on public lands. The scope o... this program is limited by definition ... certain public lands. Likewise, these ... regulations have no potential takings ... private property implications as defi... by Executive Order 12630.

The Secretaries have determined a... certify pursuant to the Unfunded Mandates Reform Act, 2 U.S.C. 1502 ... seq., that this rulemaking will not impose a cost of $100 million or mor... in any given year on local or State governments or private entities. The ... implementation of this rule is by ... Federal agencies and there is no cost ... imposed on any State or local entiti... tribal governments.

The Secretaries have determined th... these regulations meet the applicabl... standards provided in sections 3(a) a... 3(b)(2) of Executive Order 12988, ... regarding civil justice reform.

In accordance with Executive Orde... 13132, the rule does not have sufficie... federalism implications to warrant th... preparation of a Federalism Assessm... Title VIII of ANILCA precludes the State ... from exercising subsistence management authority over fish and wildlife resources on Federal lands unless it meets certain requirements.

In accordance with the President's memorandum of April 29, 1994, "Government-to-Government Relations with Native American Tribal Governments" (59 FR 22951), Executive Order 13175, and 512 DM 2, we have evaluated possible effects on Federally recognized Indian tribes and have determined that there are no effects. The Bureau of Indian Affairs is a participating agency in this rulemaking.

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, or use. This Executive Order requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As this rule is not a significant regulatory action

Thomas H. Boyd,

Acting Chief, Federal Subsistence Board.

Steve Kessler,

Subsistence Program Leader, USDA—Forest Service.

[FR Doc. 05–24353 Filed 12–21–05; 8:45 am]

BILLING CODE 4310–55–P; 3410–11–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Parts 122 and 123

[EPA–HQ–OW–2005–0523, FRL—8013–9]

National Pollutant Discharge Elimination System (NPDES) Permit Requirements for Peak Wet Weather Discharges From Publicly Owned Treatment Works Treatment Plants Serving Separate Sanitary Sewer Collection Systems

...comment to EPA ... docket. EPA's ... "anonymous ac... send an e-mail ... Docket without ... electronic publi... system automati... mail address. E-... automatically c... system are inclu... comment that is ... public docket, a... EPA's electronic ...

• Mail: Send ... copies of your c... Docket, Environ... Agency, Mailco... Pennsylvania A... DC 20460, Atter... EPA–HQ–OW–2005–0523.

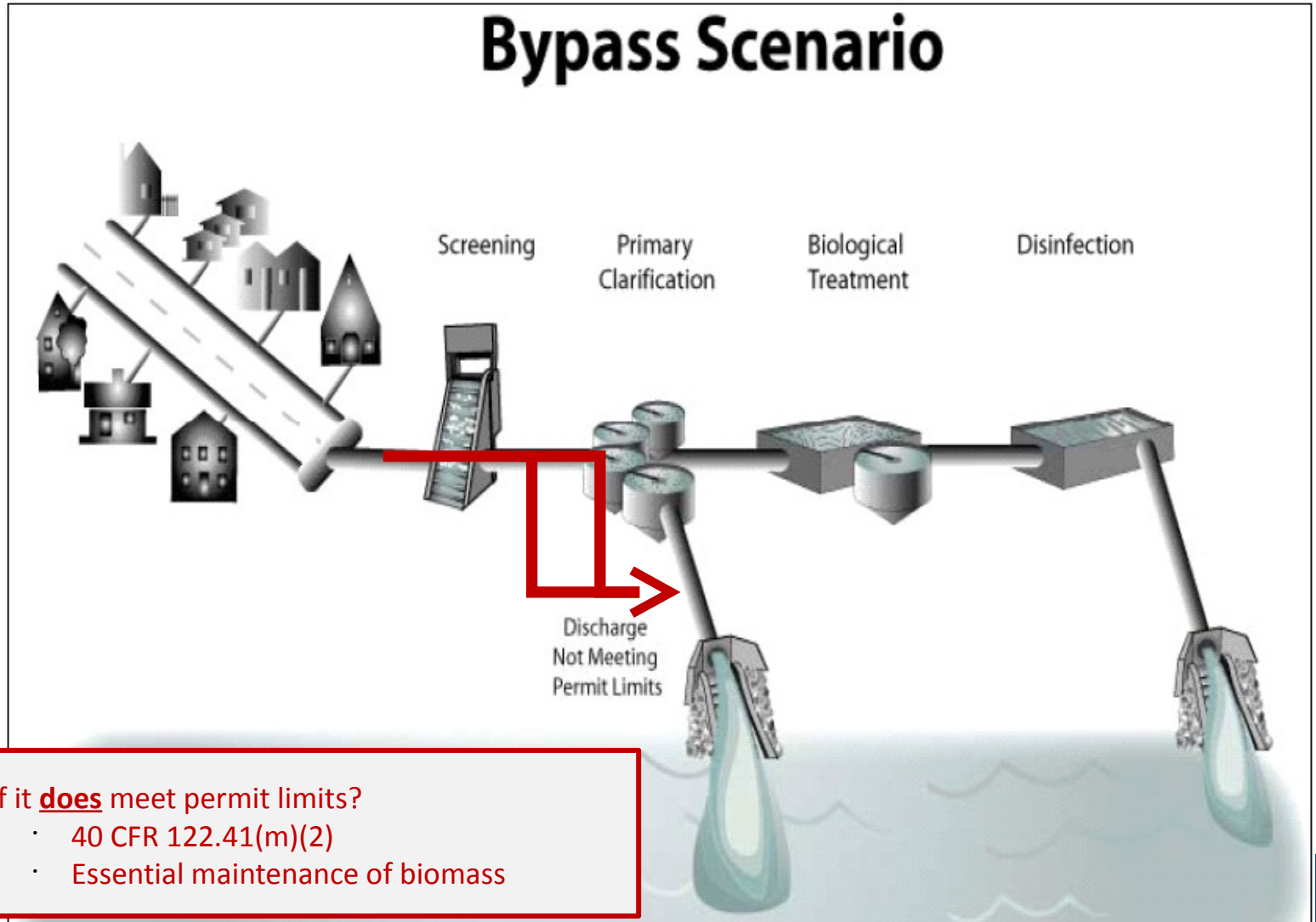
• Hand Delivery: Deliver your comments to: EPA Docket Center, EPA West, Room B102, 1301 Constitution Ave., NW., Washington, DC, Attention

Sanitary Sewer Overflows and Peak Flows Listening Sessions

US Environmental Protection Agency
Office of Water

Wet Weather Flows Certainly Have Some Different Characters

A wet-weather bypass is not well defined by current CWA regulations

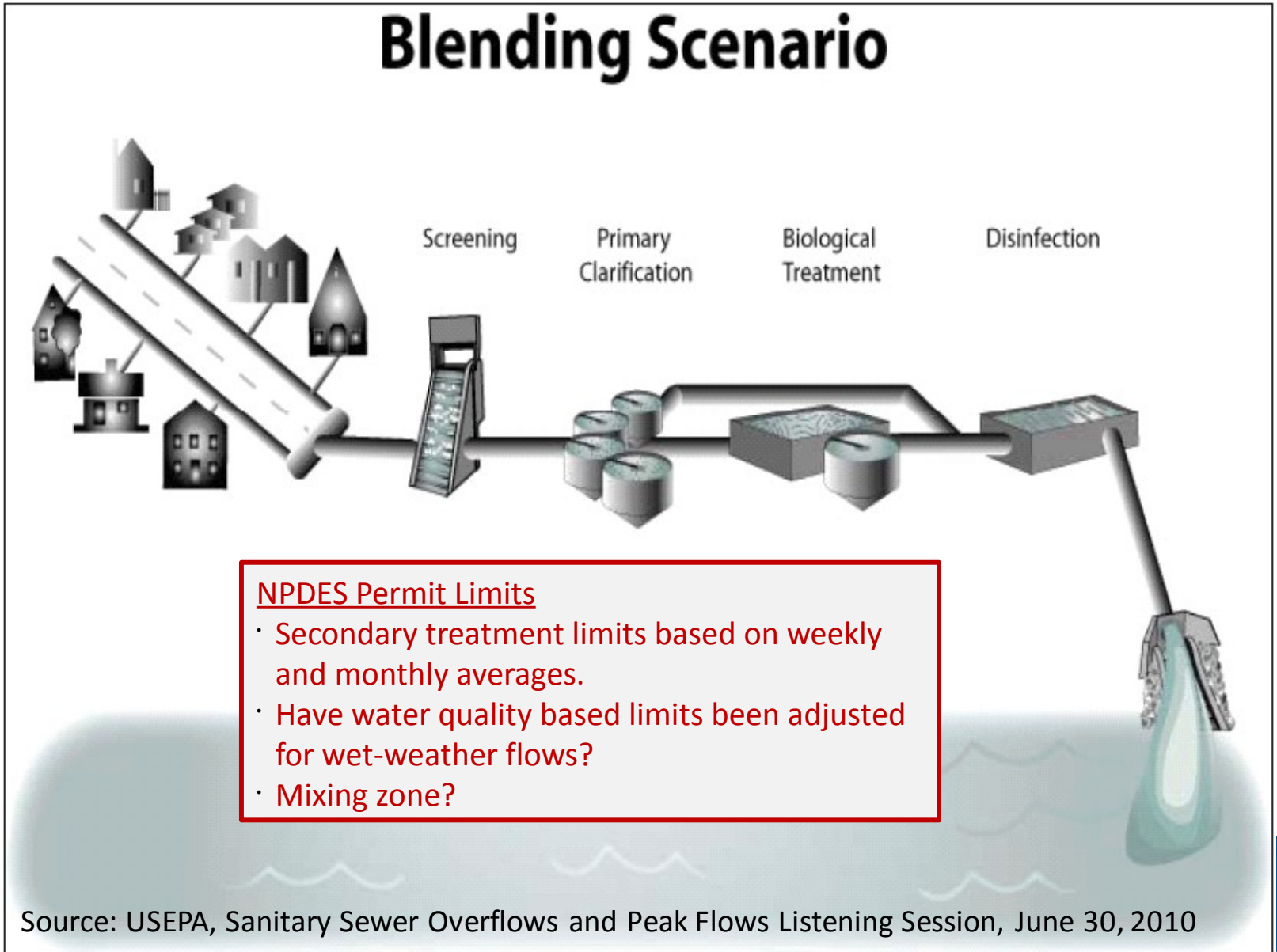


What if it **does** meet permit limits?

- 40 CFR 122.41(m)(2)
- Essential maintenance of biomass

Source: USEPA, Sanitary Sewer Overflows and Peak Flows Listening Session, June 30, 2010

"Blending" is not the same as "Bypass"



NPDES Permit Limits

- Secondary treatment limits based on weekly and monthly averages.
- Have water quality based limits been adjusted for wet-weather flows?
- Mixing zone?

Source: USEPA, Sanitary Sewer Overflows and Peak Flows Listening Session, June 30, 2010

"Secondary treatment" standards are based on much different raw material than wet-weather flows

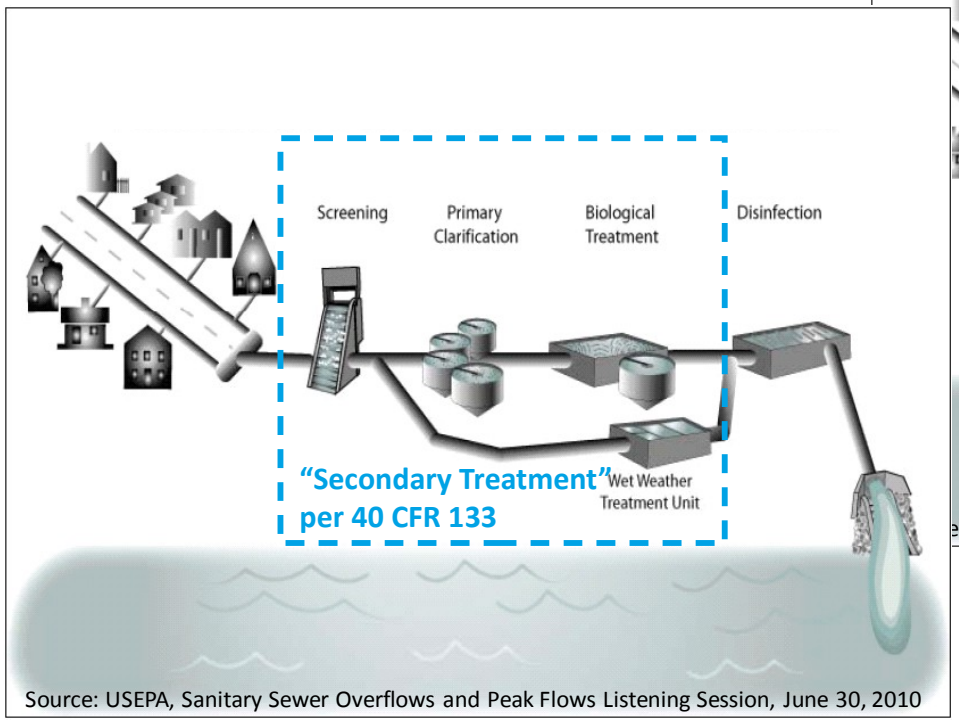
Parameter	Units	40 CFR 133.102 Secondary Treatment				40 CFR 133.105 Equivalent to Secondary Treatment			
		Max	Min	Weekly Average	Monthly Average	Max	Min	Weekly Average	Monthly Average
pH	SU	9.0	6.0	-	-	9.0	6.0	-	-
TSS	mg/L	-	-	≤45	≤30	-	-	≤65	≤45
	% Removal	-	-	-	≥85% A	-	-	-	≥65% A
BOD5	mg/L	-	-	≤45	≤30	-	-	≤65	≤45
	% Removal	-	-	-	≥85% A	-	-	-	≥65% A

A. Based on monthly average influent and effluent concentrations only. Special considerations for lower requirements with combined sewers and less concentrated influent for separate sewers.

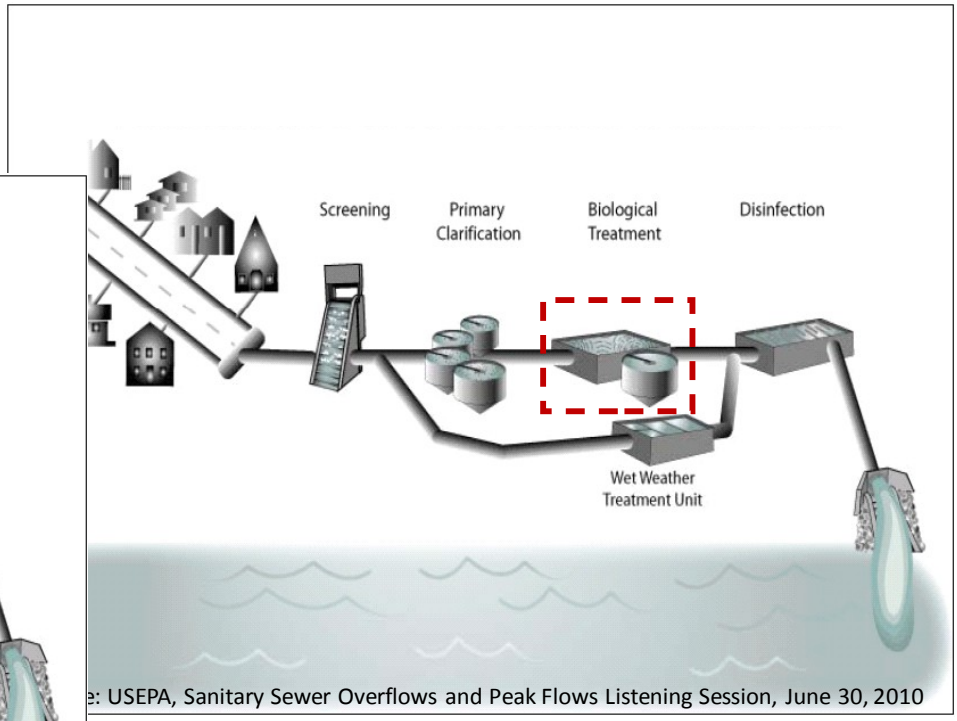
- Assumes steady influent… TSS/BOD = 200/200 mg/L
- Long-term performance **across entire POTW**…not short-term performance criteria for biological trains…not wet-weather influent conditions
- Narrative allowances in 40 CFR 133 and 122(m) for wet weather

Wet Weather Flows Certainly Have Some Different Characters

The meaning of "secondary treatment" in recent draft policies may have been misinterpreted…



Source: USEPA, Sanitary Sewer Overflows and Peak Flows Listening Session, June 30, 2010



e: USEPA, Sanitary Sewer Overflows and Peak Flows Listening Session, June 30, 2010

"Secondary" ≠ "Biological".
Unintended consequence from focusing only on dry weather.

…but underlying regulations appear to support a ~~more holistic~~ approach.

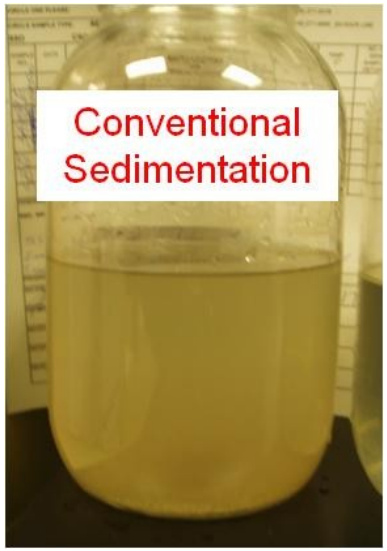
Wet Weather Flows Certainly Have Some Different Characters

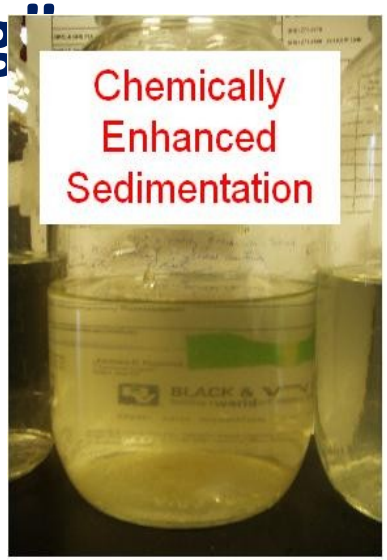
As the clean water industry matures…

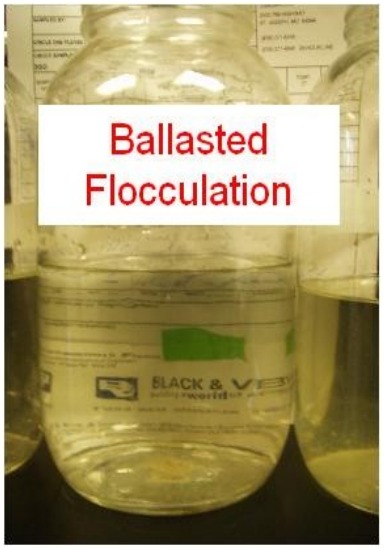
- When the secondary treatment regulation was promulgated, the regulatory significance of "primary treatment" changed.
- More emphasis now being placed on water quality-based effluent limits.
- As technologies advance into new applications, new technology-based effluent limits may need to be developed.

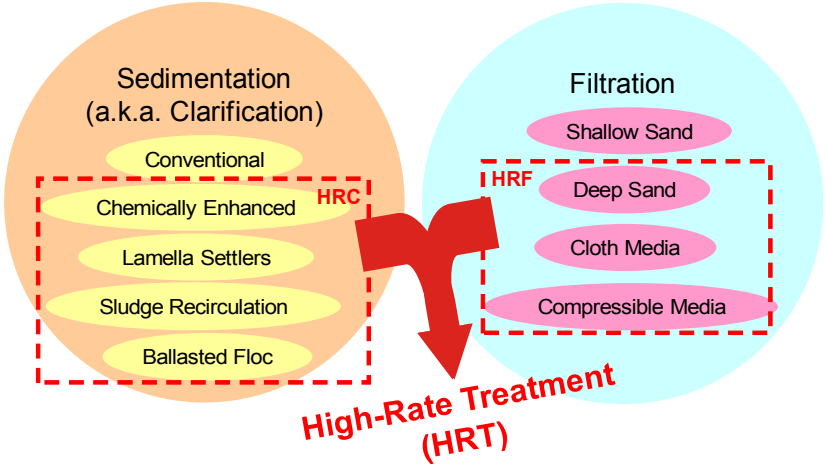
- …the relevance and meaning of "primary treatment" and "secondary treatment" will

Effluent quality from enhanced HRT technologies is clearly better than what was envisioned for "bypass" and "blending"

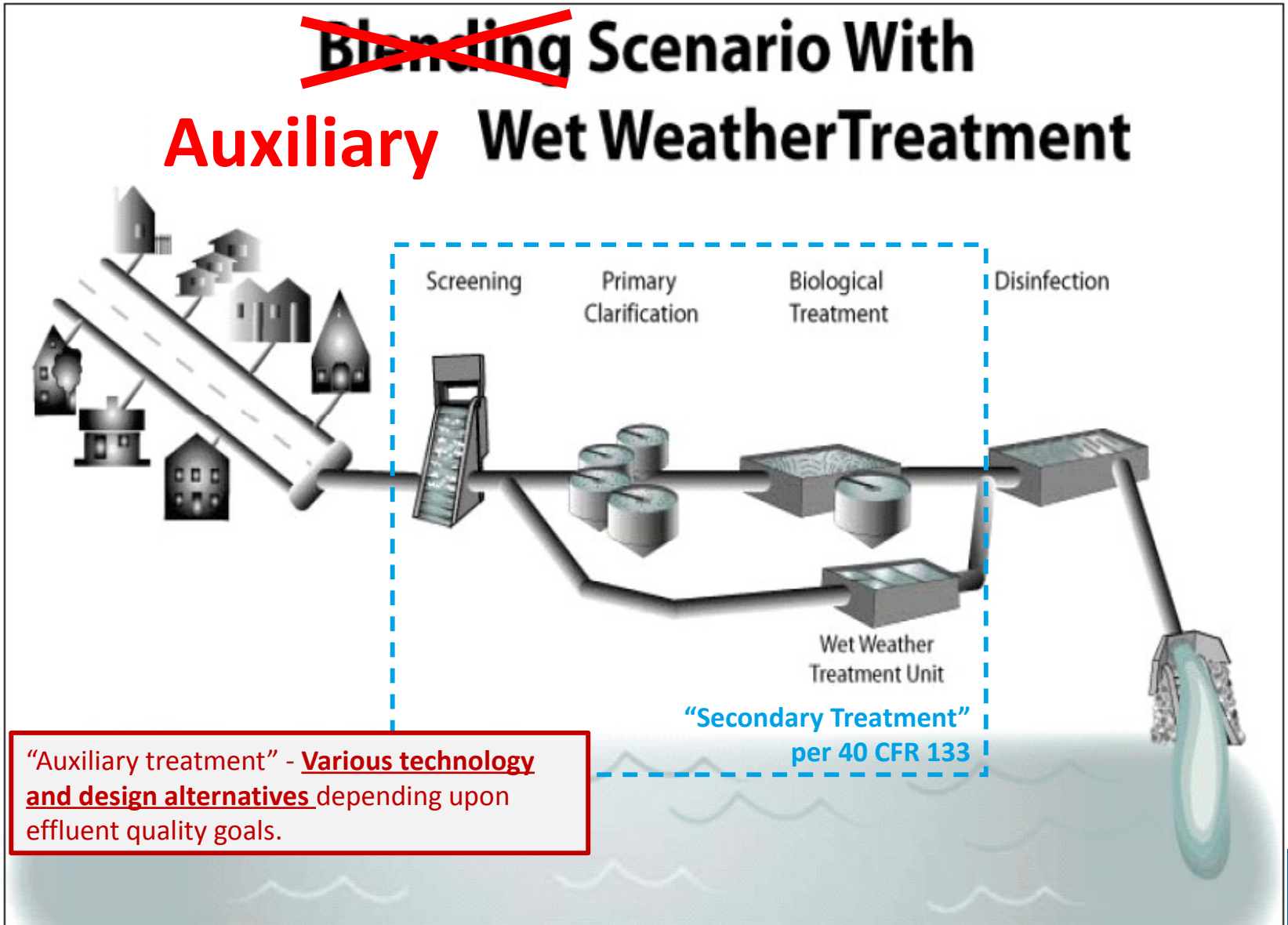






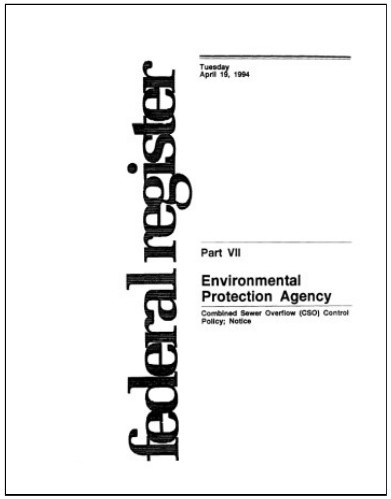


Wet-weather HRT is not "bypass" or "blending"



Source: USEPA, Sanitary Sewer Overflows and Peak Flows Listening Session, June 30, 2010

USEPA CSO Policy is supportive of Auxiliary Treatment Strategy

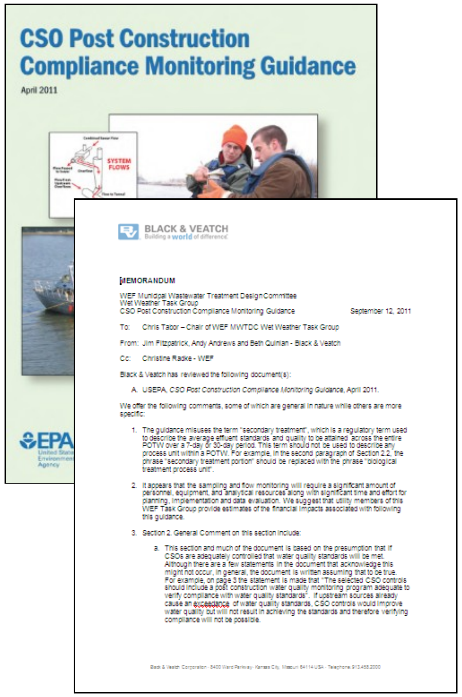

federal register

Tuesday
April 19, 1994

Part VII

Environmental Protection Agency

Combined Sewer Overflow (CSO) Control Policy; Notice


CSO Post Construction Compliance Monitoring Guidance

April 2011

BLACK & VEATCH

MEMORANDUM

WEF Municipal Wastewater Treatment Design Committee
Wet Weather Task Group
CSO Post Construction Compliance Monitoring Guidance — September 12, 2011

To: Chris Tasor – Chair of WEF MWTDC Wet Weather Task Group

From: Jim Fitzpatrick, Andy Andrews and Beth Quinlan - Black & Veatch

Cc: Christine Radke - WEF

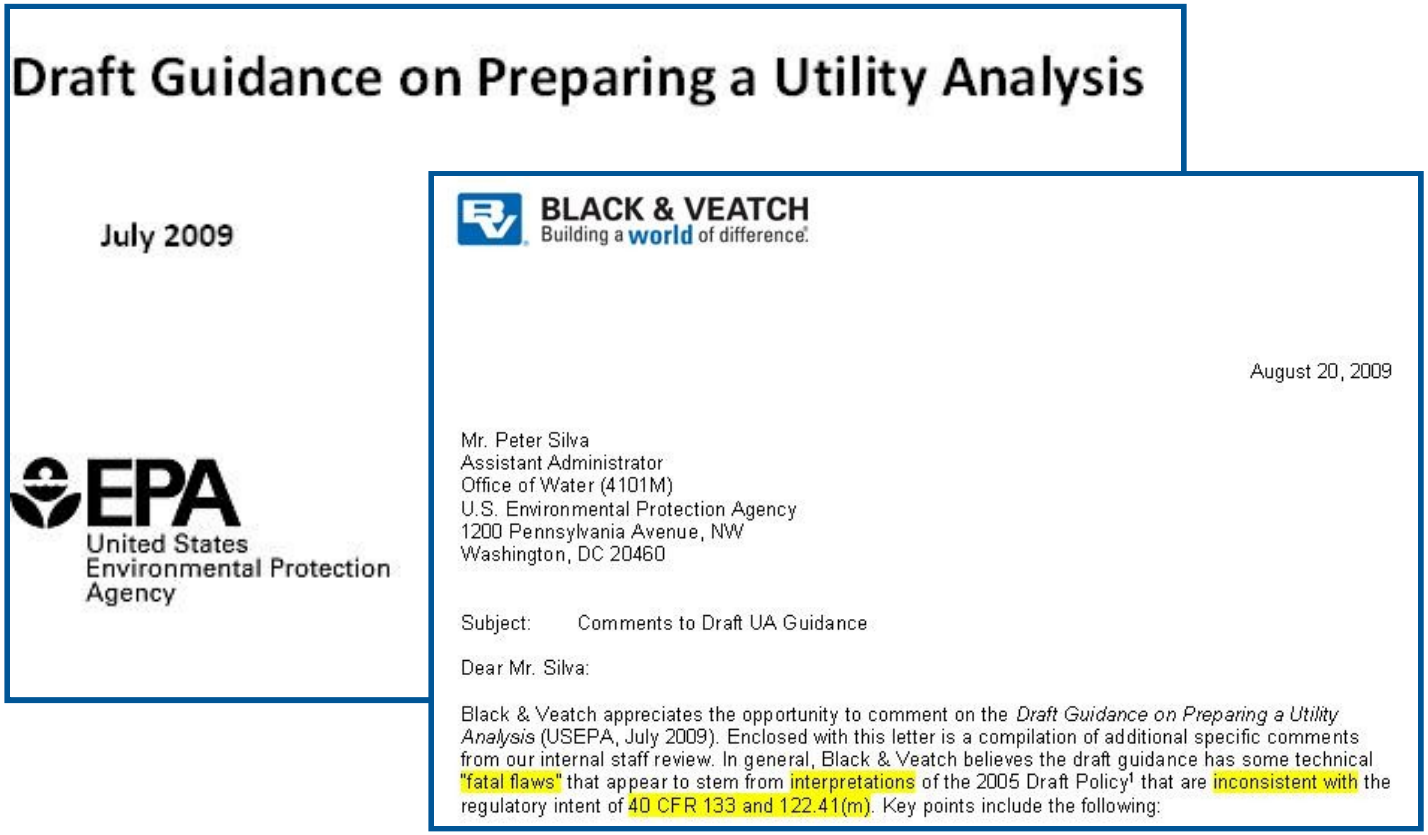
Black & Veatch has reviewed the following document(s):

A. USEPA, *CSO Post Construction Compliance Monitoring Guidance*, April 2011.

We offer the following comments, some of which are general in nature while others are more specific:

1. The guidance misuses the term "secondary treatment", which is a regulatory term used to describe the average effluent standards and quality to be attained across the entire POTW over a 7-day, 30-day period. This term should not be used to describe any process unit within a POTW. For example, in the second paragraph of Section 2.2, the phrase "secondary treatment portion" should be replaced with the phrase "biological treatment process unit".
2. It appears that the sampling and flow monitoring will require a significant amount of personnel, equipment, and analytical resources along with significant time and effort for planning, implementation and data evaluation. We suggest that utility members of this WEF Task Group provide estimates of the financial impacts associated with following this guidance.
3. Section 2, General Comment on this section include:
   a. This section and much of the document is based on the presumption that if CSOs are adequately controlled that water quality standards will be met. Although there are a few statements in the document that acknowledge this might not occur, in general, the document is written assuming that to be true. For example, on page 3 the statement is made that "The selected CSO controls should include a post construction water quality monitoring program adequate to verify compliance with water quality standards". If upstream sources already cause an exceedance of water quality standards, CSO controls would improve water quality but will not result in achieving the standards and therefore verifying compliance will not be possible.

Recent Regulatory Proposals may have initially discouraged auxiliary treatment for SSO control...



Draft Guidance on Preparing a Utility Analysis

July 2009

EPA
United States
Environmental Protection
Agency

BLACK & VEATCH
Building a world of difference.

August 20, 2009

Mr. Peter Silva
Assistant Administrator
Office of Water (4101M)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: Comments to Draft UA Guidance

Dear Mr. Silva:

Black & Veatch appreciates the opportunity to comment on the *Draft Guidance on Preparing a Utility Analysis* (USEPA, July 2009). Enclosed with this letter is a compilation of additional specific comments from our internal staff review. In general, Black & Veatch believes the draft guidance has some technical "fatal flaws" that appear to stem from interpretations of the 2005 Draft Policy[1] that are inconsistent with the regulatory intent of 40 CFR 133 and 122.41(m). Key points include the following:

- …but SSO and Peak Flow Policy has not been finalized by USEPA

Abbreviated Utility Analysis ("no feasible alternative analysis") in recent IEPA permits

a. Existing Treatment Plant Capacity and Improvements Study

b. Historical Wet Weather Diversion Characterization and Alternatives Evaluation

c. Future Wet Weather Diversion Characterization and Alternatives Evaluation

d. Existing Storage and Alternatives Evaluation

e. Assess Other Ways to Reduce Peak Wet Weather Flow Volumes

f. Evaluate Auxiliary Treatment Alternatives

g. Evaluate I/I Reduction Measures

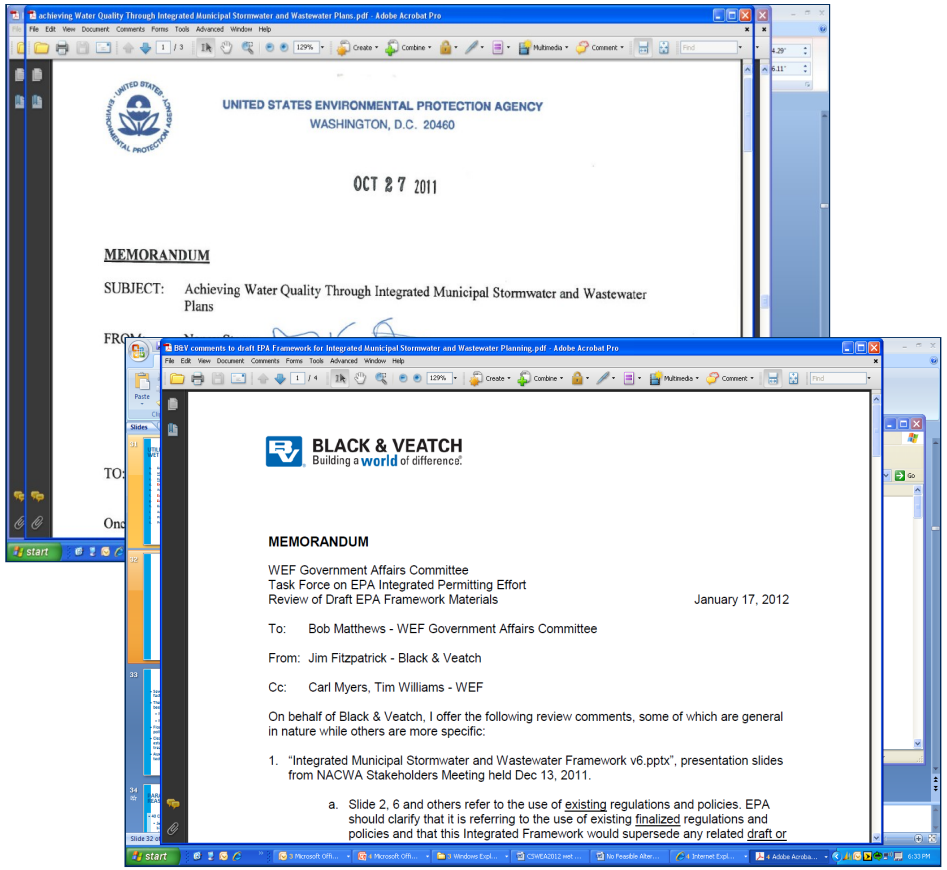
h. Evaluate Impact from Implementation of C-MOM Programs

i. Assess Community's Ability to Fund Peak Wet Weather Flow Improvements

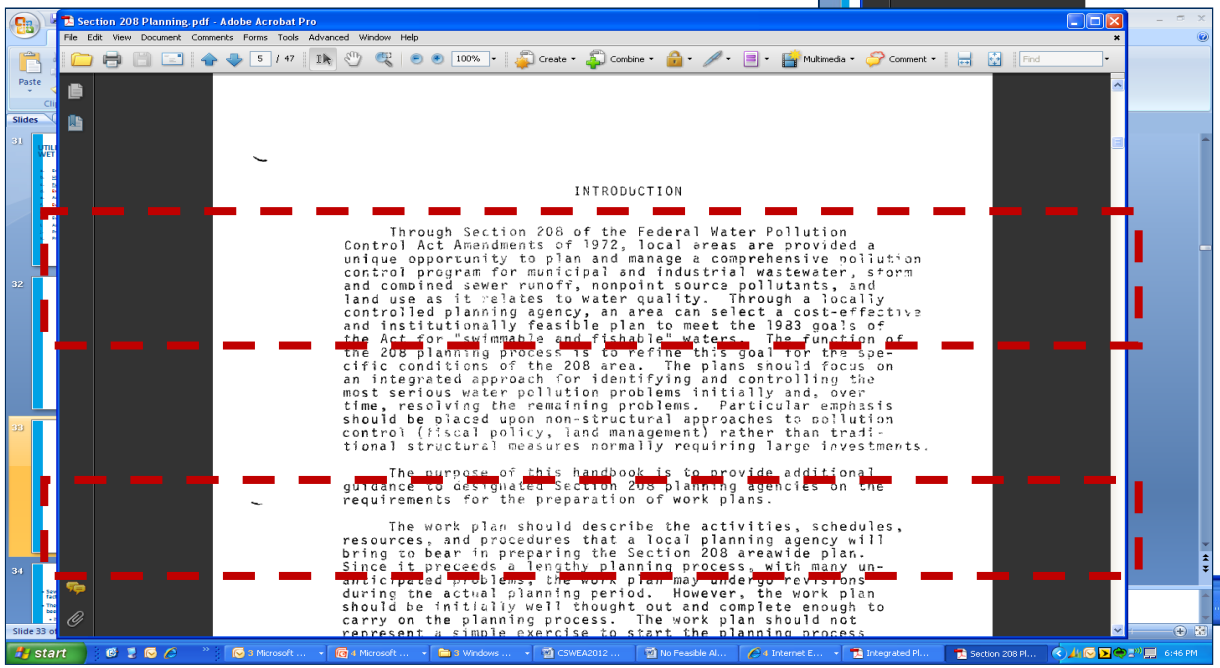
j. Propose Monitoring Protocol for Recombined Effluent

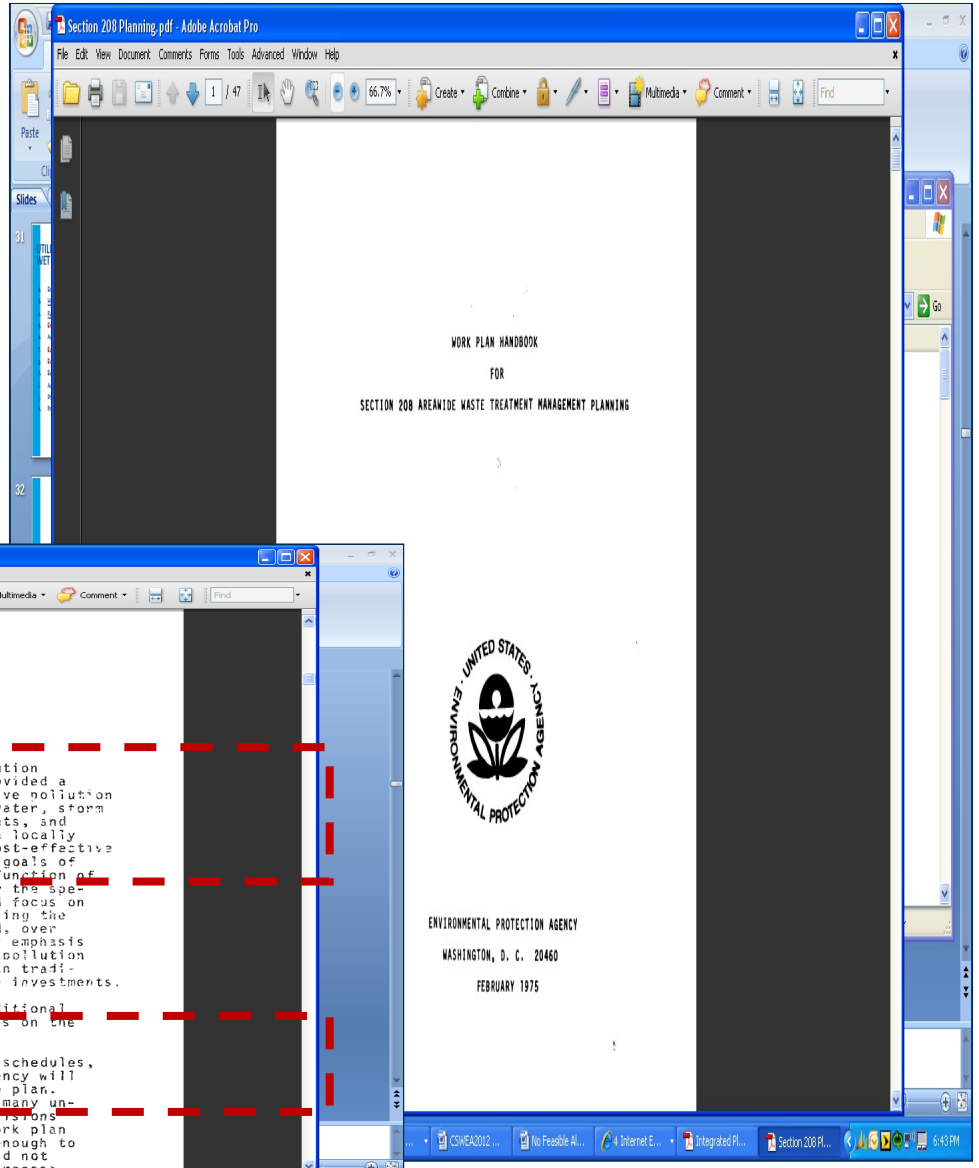
Recent USEPA focus on Integrated wastewater and stormwater management planning

- Communities evaluate how best to meet all their CWA requirements
  - Coordinate sequence of wastewater and stormwater projects. Prioritize based on environmental benefit.
  - Emphasize innovative solutions, such as green infrastructure.
  - Use flexibility of existing CWA regulations.



Integrated CWA approaches previously supported by USEPA

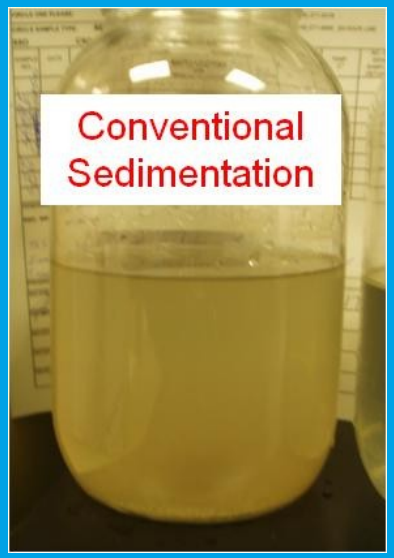


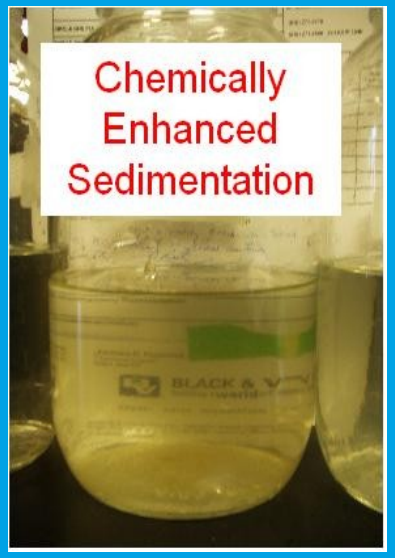


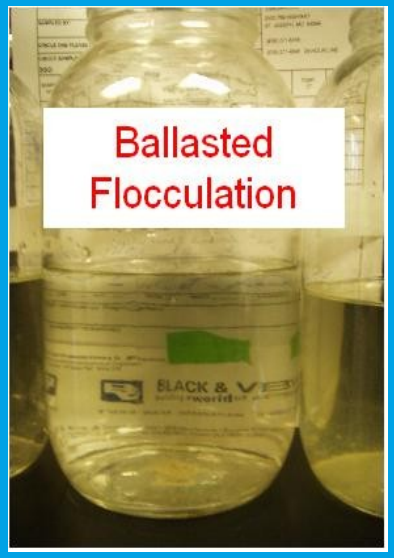
- Section 208 Water Quality Planning

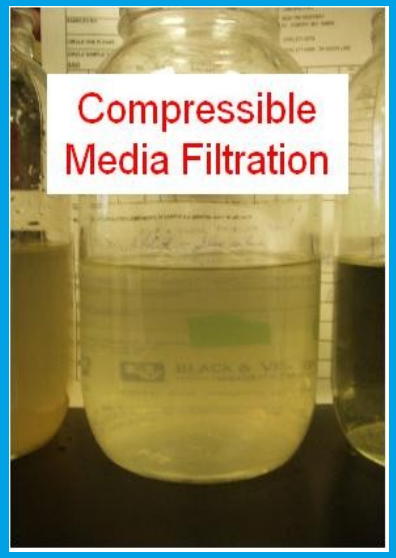
Treatment Solutions Tailored to the Problem

Wet Weather Flows Certainly Have Some Different Characters







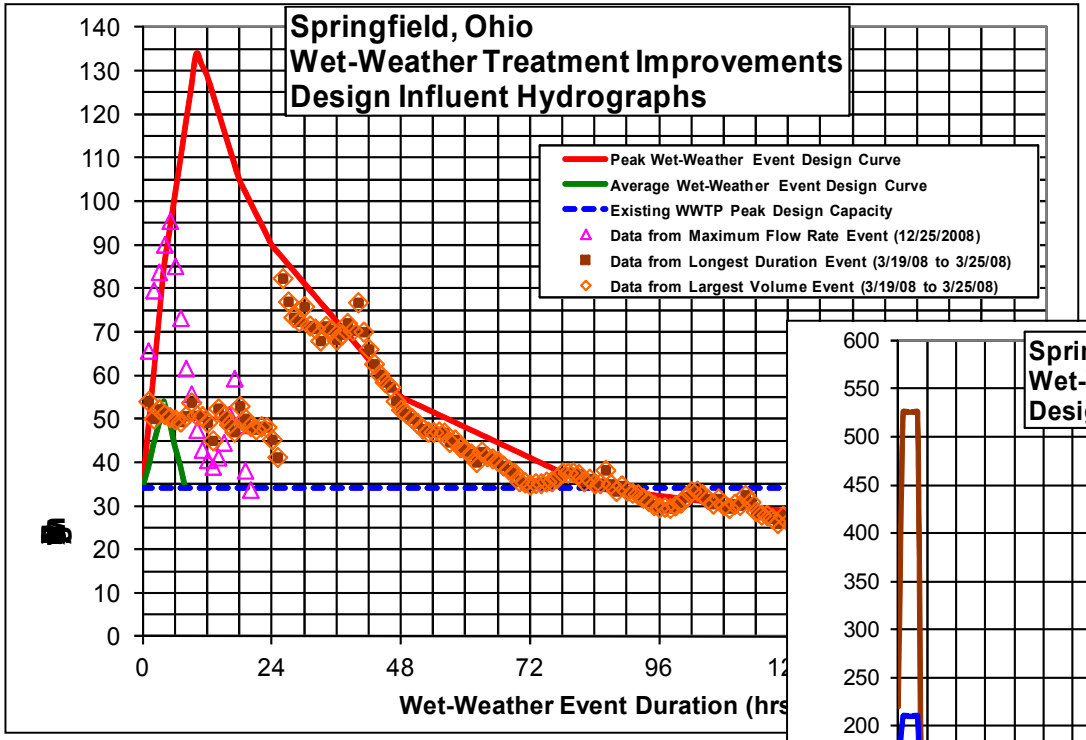


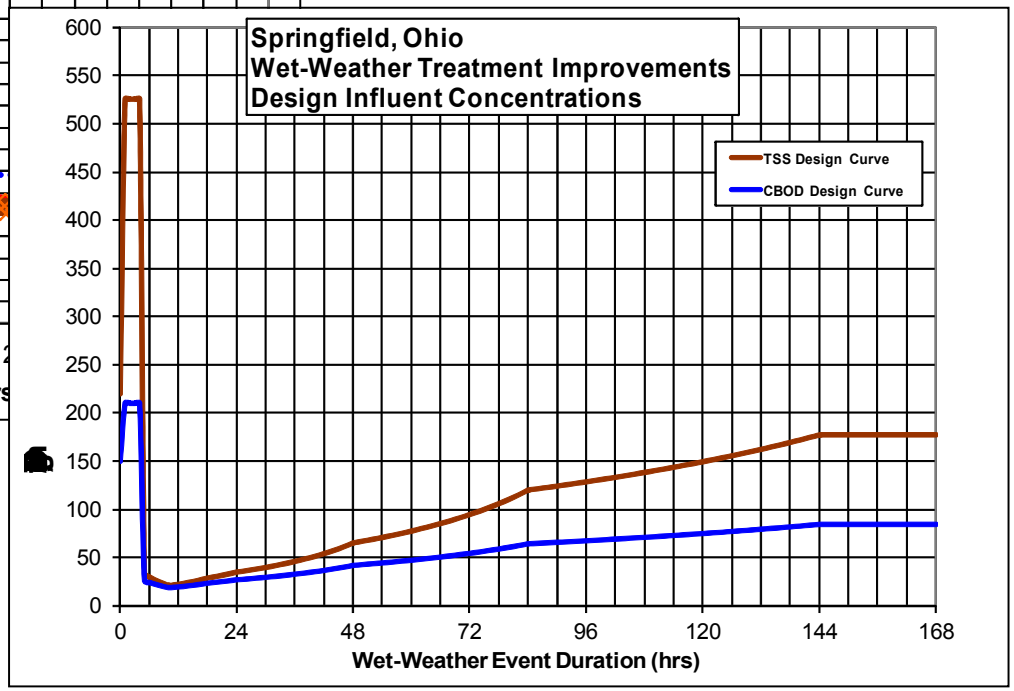
Many of today's auxiliary treatment alternatives were not established when

General Approach to evaluate wet-weather treatment alternatives

- **Wet-Weather Influent Characterization**
  - See "How Wet Weather Flows are **Different**"
  - Develop influent hydrograph and pollutographs to establish design event magnitude, duration and frequency.
- **Maximize Use of Existing Facilities**
  - Evaluate peak capacity with wet-weather operational changes
  - Recognize limitations of biological treatment processes
- **If Needed, Increase Wet-Weather Flow Treatment Capacity**
  - Evaluate auxiliary treatment alternatives

Realistic Influent Hydrographs and Pollutographs…



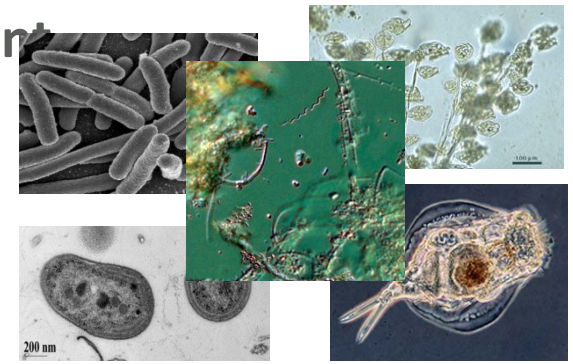


- …are keys to avoid overly conservative wet-weather treatment design criteria

Wet Weather Flows Certainly Have Some Different Characters

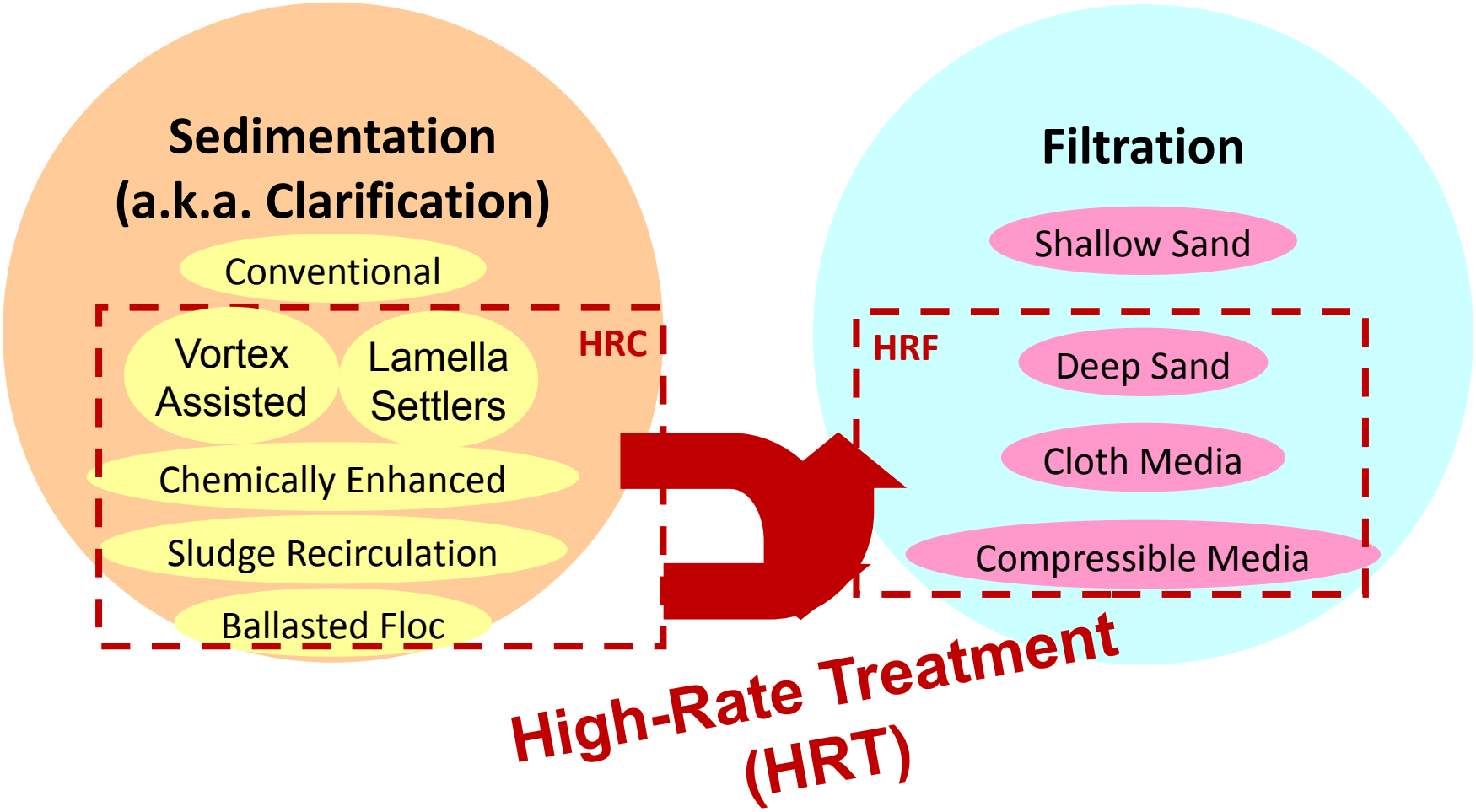
Biological treatment processes can be optimized to handle some wet-weather flows, but have inherent limitations

- Inexact capacity - Different storm-to-storm, antecedent conditions, etc.
- Cold influent (snowmelt) challenges
- **More treatment infrastructure won't necessarily increase amount of biological treatment**…biomass has finite capacity…slow kinetics…dilute influent
- Protect your biomass
  - Absolutely critical treatment "equipment"
  - Full recovery can take weeks or months
- Biological nutrient removal (BNR) processes are particularly sensitive to wet-weather upsets



Don't Upset Your Bugs!

Various process and technology alternatives for wet-weather HRT



- Many of today's HRT technologies weren't envisioned when "bypass" and "blending" were

Conventional Sedimentation

- Also known as:
  - Primary Clarification
  - Settling
  - Gravity Settling
  - *Primary Treatment*

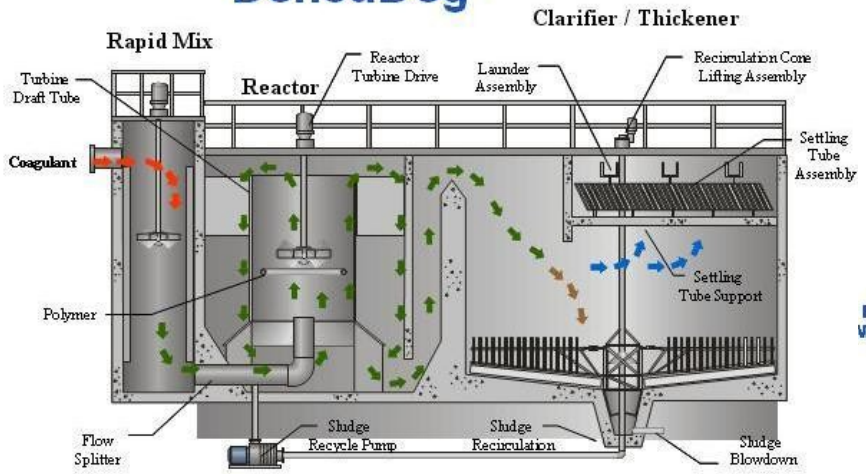
- Frame of reference for HRT or EHRT technologies

Chemically enhanced sedimentation continues to prove its effectiveness

- **1500 BC –** Alum coagulation by Egyptians
- **1740 AD –** Chemical sewage treatment in Paris
- **Today –** Resurgence of interest in **CEPT** (Chemically Enhanced Primary Treatment), **CES** (Chemically Enhanced Sedimentation or Settling), **CEC** (Chemically Enhanced Clarification), **CAS** (Chemically Assisted Settling)…

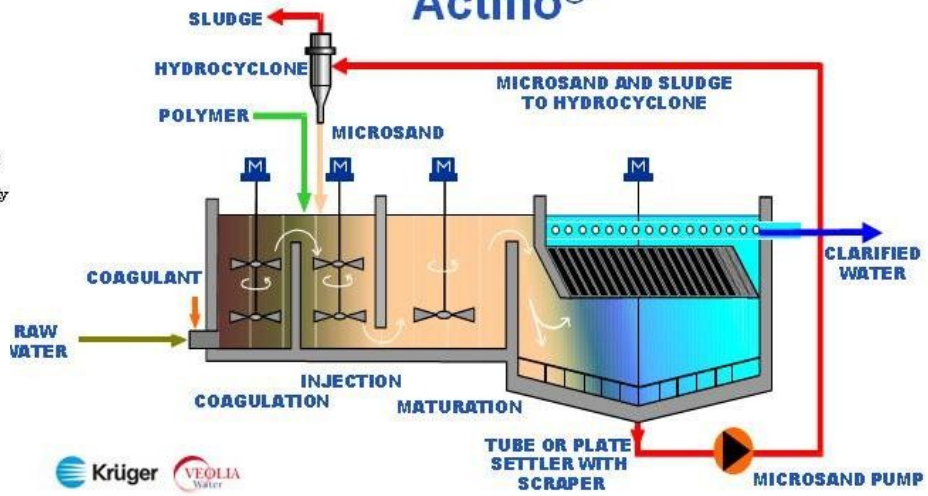
Sludge recirculation and ballasted flocculation further enhance CES performance

DensaDeg®



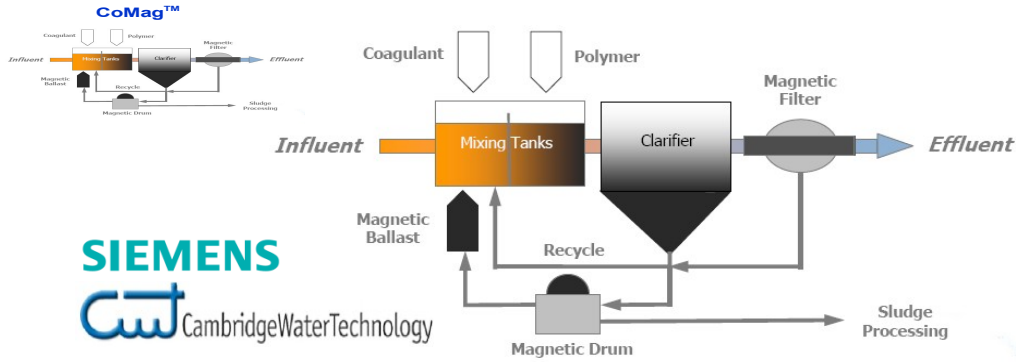
Infilco Degremont SUEZ

Actiflo®



Krüger VEOLIA Water

CoMag™



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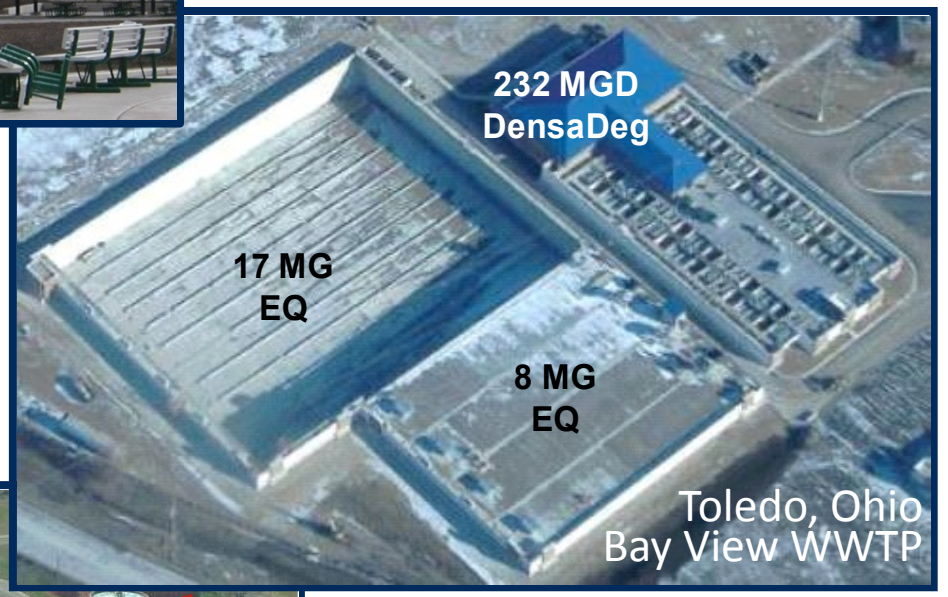
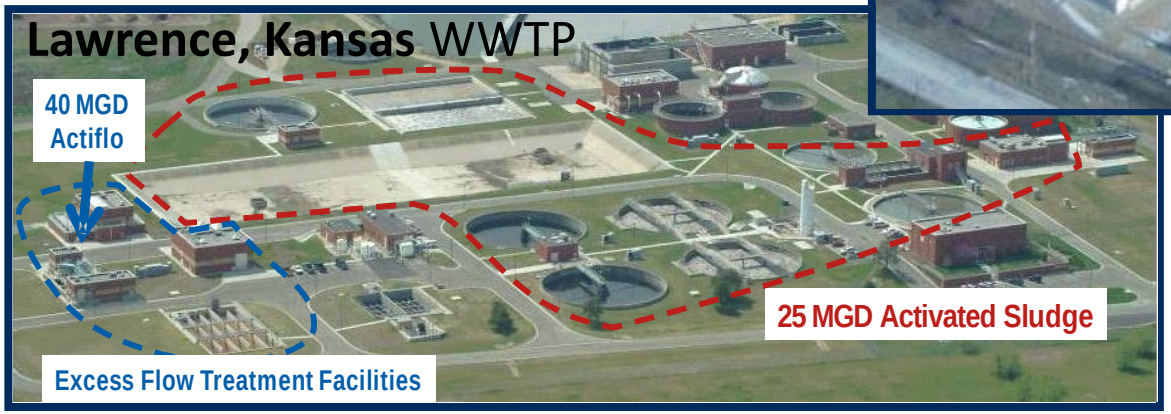
Wet Weather Flows Certainly Have Some Different Characters

Example Auxiliary HRC facilities include…

- Satellite PEFTF
- SSO Control

- In-plant Facilities
- cSO Control





- In-plant Facilities
- sSO Control

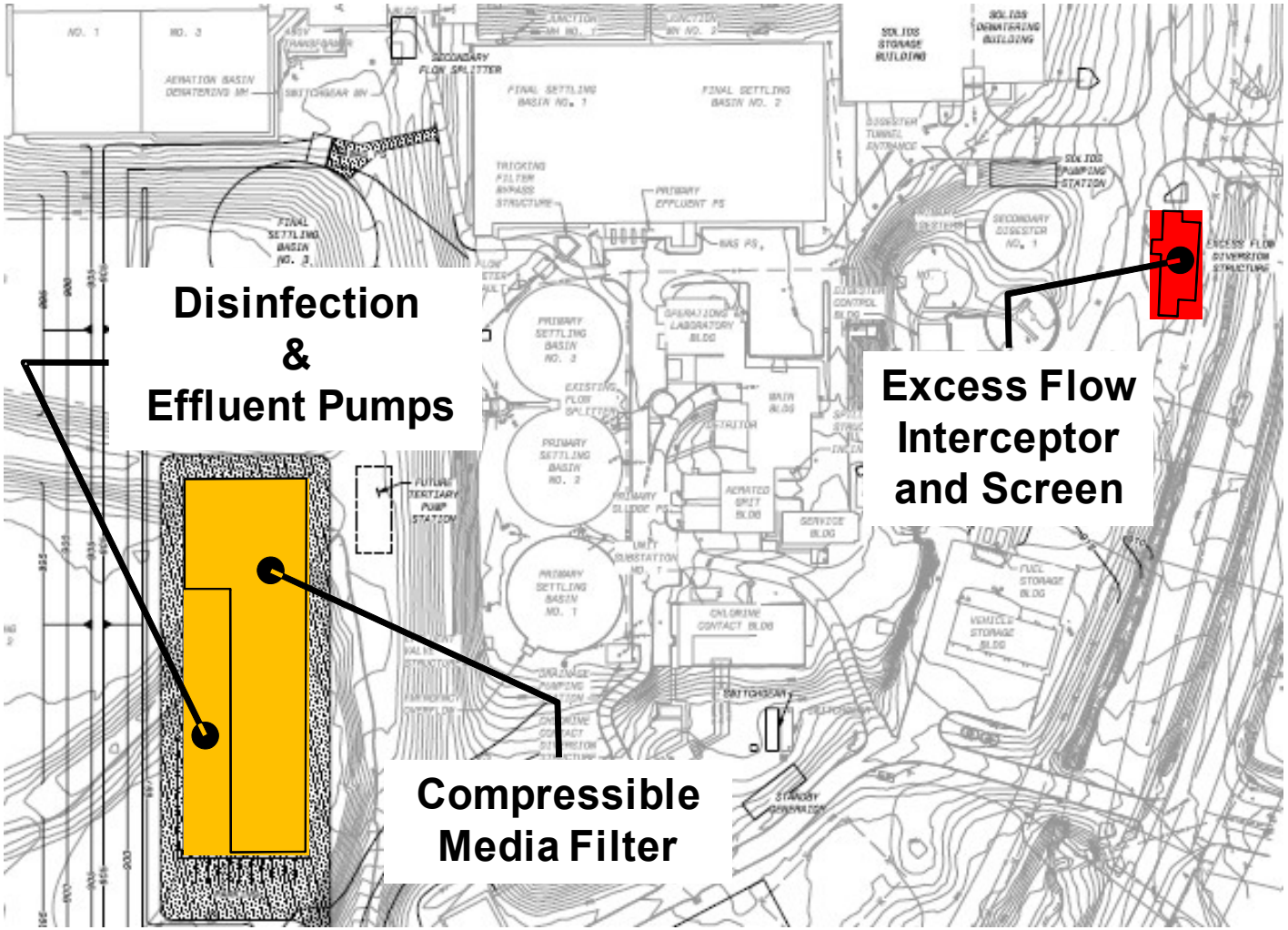
Wet Weather Flows Certainly Have Some Different Characters

High-Rate Filtration offers similar effluent Quality as Chemically Enhanced HRC…

- 2000 BC – Granular filtration in ancient Sanskrit writings
- Today
  - Deep-bed granular media
  - Compressible media
  - Cloth media

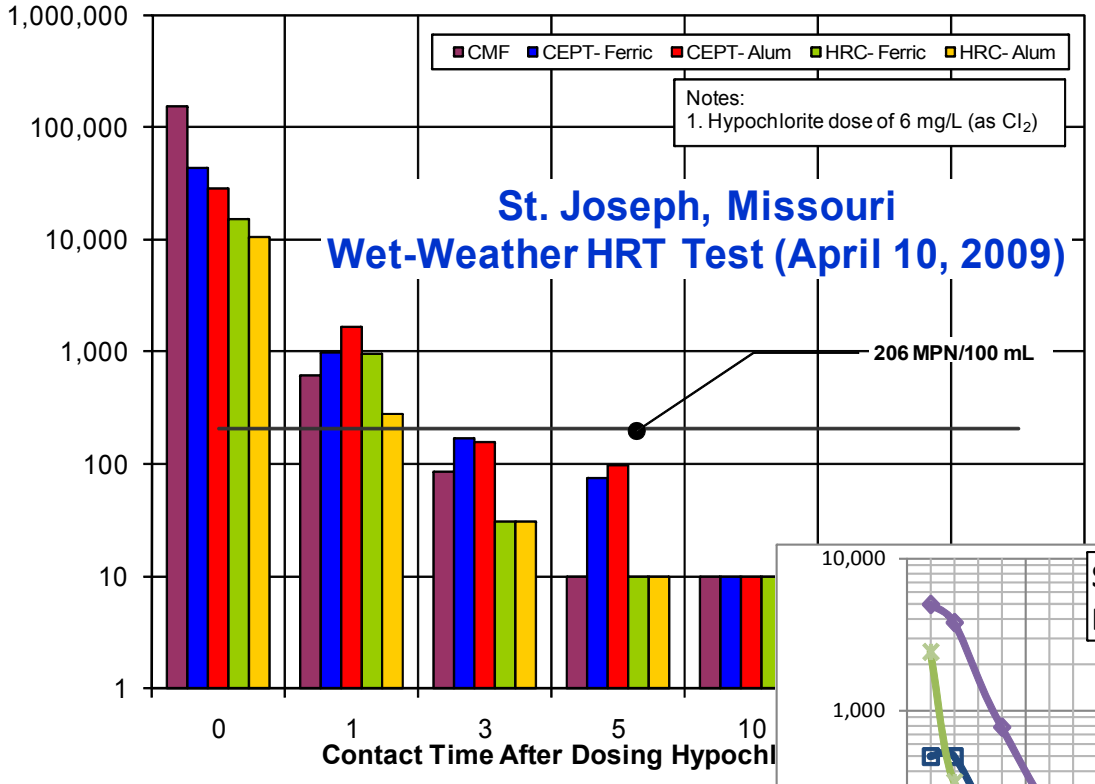
- … with potential operational advantages, no chemicals

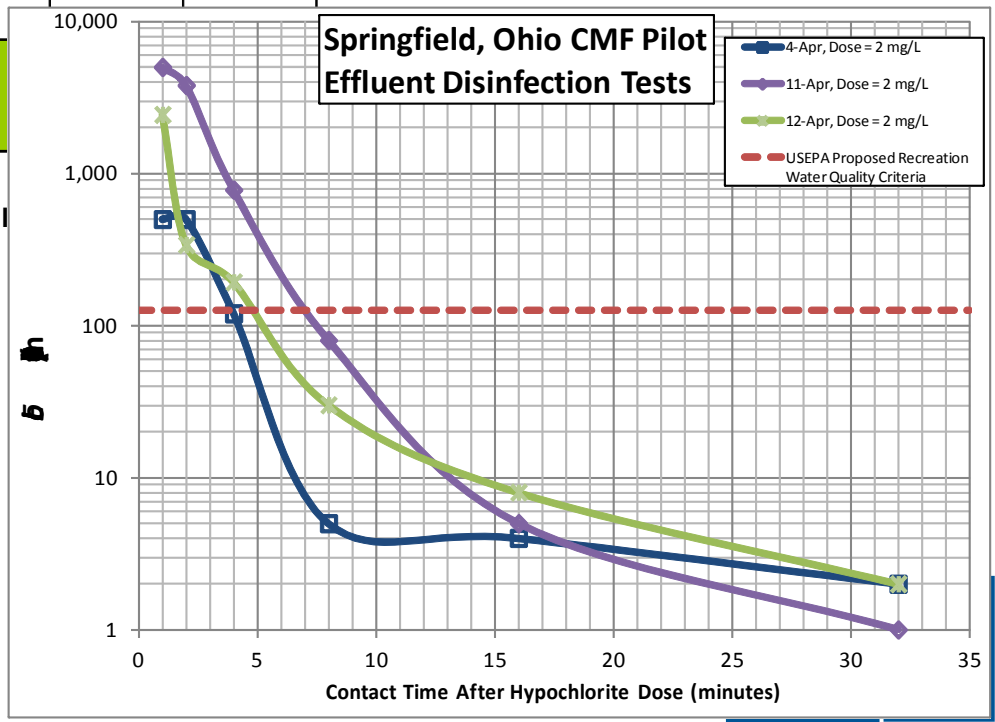
100% design stage of world's largest Auxiliary HRF Facility



- New 100-mgd CMF is part of Springfield, Ohio's CSO Long Term Control Plan

Consistent Disinfection of EHRT Effluent

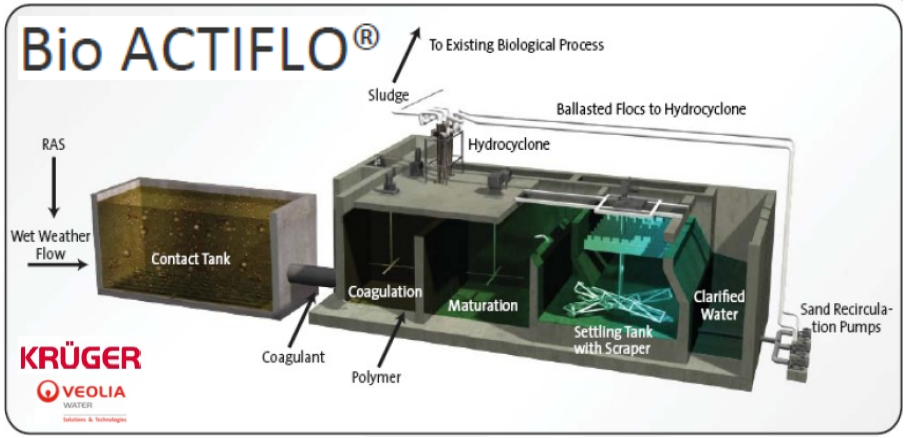


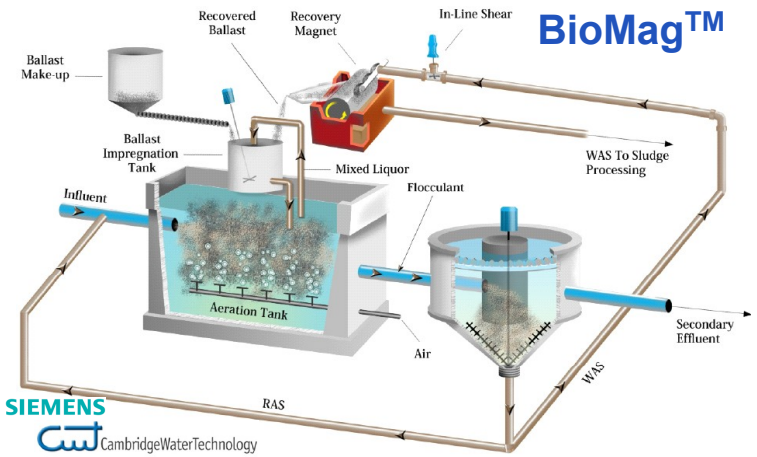


- EHRT effluent very amenable to 10-

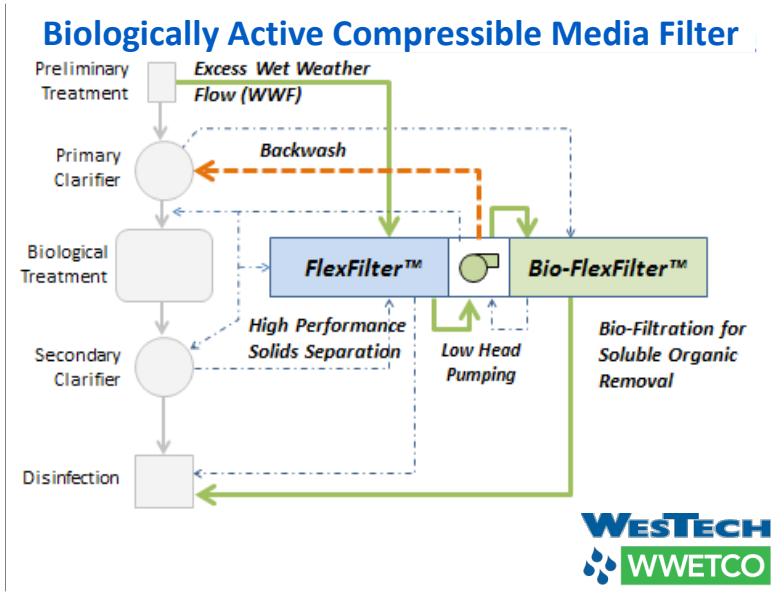
Wet Weather Flows Certainly Have Some Different Characters

HRT Technologies continue to Evolve and emerge





- Will biocontact provide meaningful benefit for added complexity and expense?
- Feasibility for remote CSO, SSO or



Other areas of R&D into EHRT

Milwaukee side-by-side trials

- Full-scale CES
- Pilot-scale Biocontact
- Pilot-scale CMF

Toledo pathogen study

- True pathogens and indicator organisms
- Full-scale parallel AS and DensaDeg HRC
- Pre- and post- chlor/dechlor
- Actual wet-weather discharge conditions

TOLEDO WATERWAYS INITIATIVE

Pathogen Study

2011 Annual Report

FINAL

February 2012

Pathogen Study / 164166

PROGRAM MANAGER

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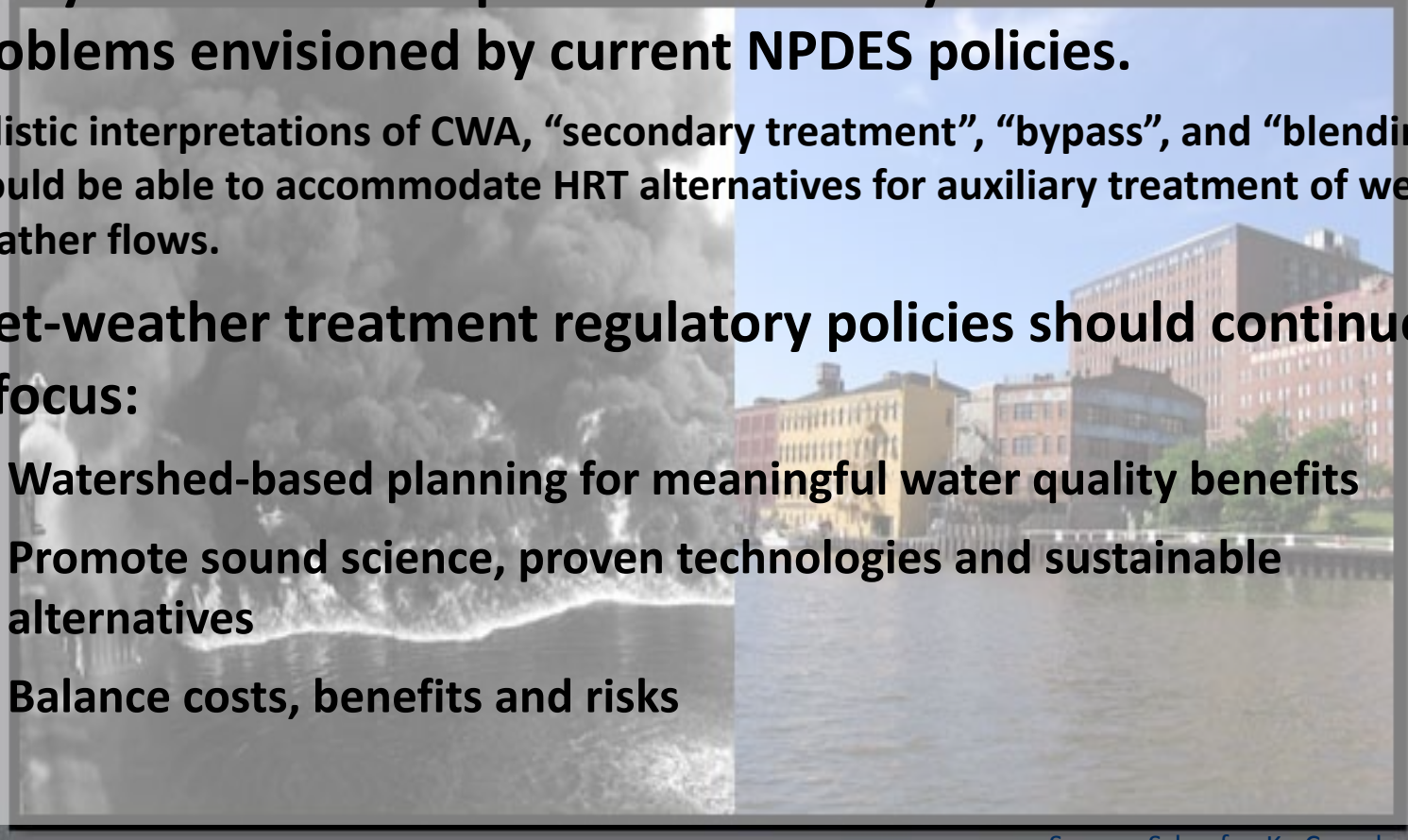
- **Helping fill data-gaps about treatment during actual wet-weather conditions**

Some Closing Thoughts

- **Today's wet-weather problem is entirely different than most problems envisioned by current NPDES policies.**
- **Holistic interpretations of CWA, "secondary treatment", "bypass", and "blending" should be able to accommodate HRT alternatives for auxiliary treatment of wet-weather flows.**
- **Wet-weather treatment regulatory policies should continue to refocus:**
  - **Watershed-based planning for meaningful water quality benefits**
  - **Promote sound science, proven technologies and sustainable alternatives**
  - **Balance costs, benefits and risks**



Source: Schaefer, K.; Comeback of the Cuyahoga River, WKSU Public Radio, http://www.wksu.org/news/story/23583 (accessed Sept 22, 2010).

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