

NACWA Pretreatment & Pollution Prevention Workshop

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CENTRAL CONTRA COSTA SANITARY DISTRICT



Pretreatment Investigations – We Found the Needle!



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Central Contra Costa Sanitary District**

Central Contra Costa Sanitary District Plant Processes Related to Turbidity Events

- **Activated Sludge/Anaerobic Selector**
Low MCRT = High Wasting Rate
- **Ultraviolet Disinfection**
Requires < 5.0 NTUs For Efficiency
- **Filter Plant to produce Reclaimed Water**
Low Chemical Costs if < 2.0 NTUs



**ULTRAVIOLET DISINFECTION
60 MGD DISINFECTION CAPACITY**

HISTORY OF TURBIDITY EVENTS

- Turbidity events since late 1990s
- Turbidity events of 2003 (36 NTUs)
- District Task Force formed
- Turbidity events of 2004 (50 NTUs)
- Turbidity Excursion Focus Group “TExFoG”

Why is turbidity a problem at CCCSD Treatment Plant?



Higher turbidity requires more polymer to achieve standards to deliver recycled water

More UV lamps = more energy required to achieve disinfection

Turbidity excursions = \$ and higher risk of violations

Turbidity Excursion Focus Group (TExFoG)

- Analyzed Collection System activities
- Adjusted Plant processes
- Scrutinized Pretreatment Program
- Examined Capital Improvement Projects
- Literature review



SOURCE CONTROL'S ROLE

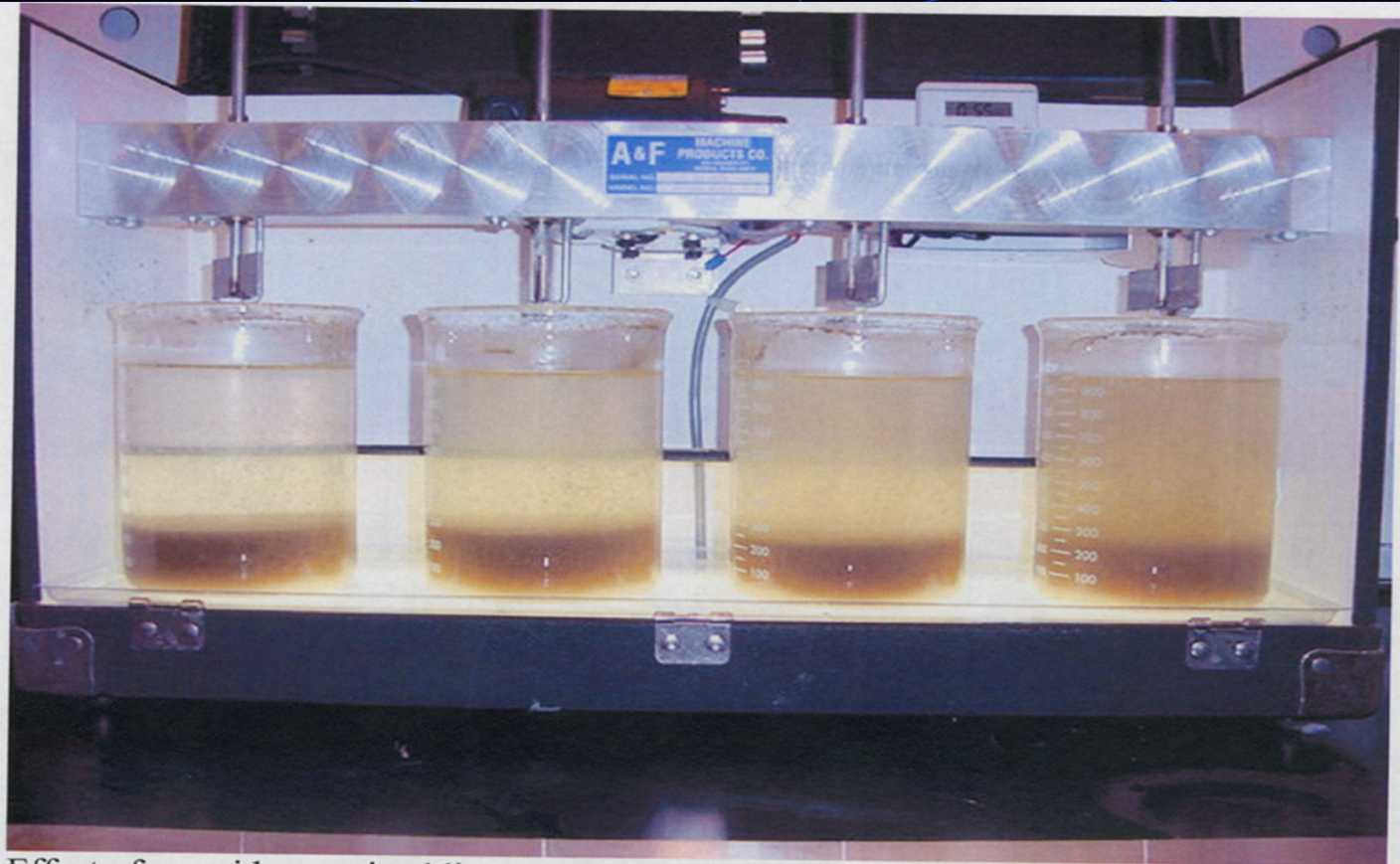
- Collection System trunk lines
- Treatment Plant processes
- Industrial User Interviews
- Trucked Waste loads
- Inspections of other companies in County's Hazardous Materials database



But What Are We Hunting For?

- pH change? e.g. crown spraying
- Turbidity? e.g. microtunneling
- Toxicity? e.g. antibacterial agents
- Salinity? e.g. drinking/cooling water treatment systems
- Something else? e.g. deflocculation





Effect of cyanide on mixed liquor settleability at 2, 5 and 15 mg/L CN.

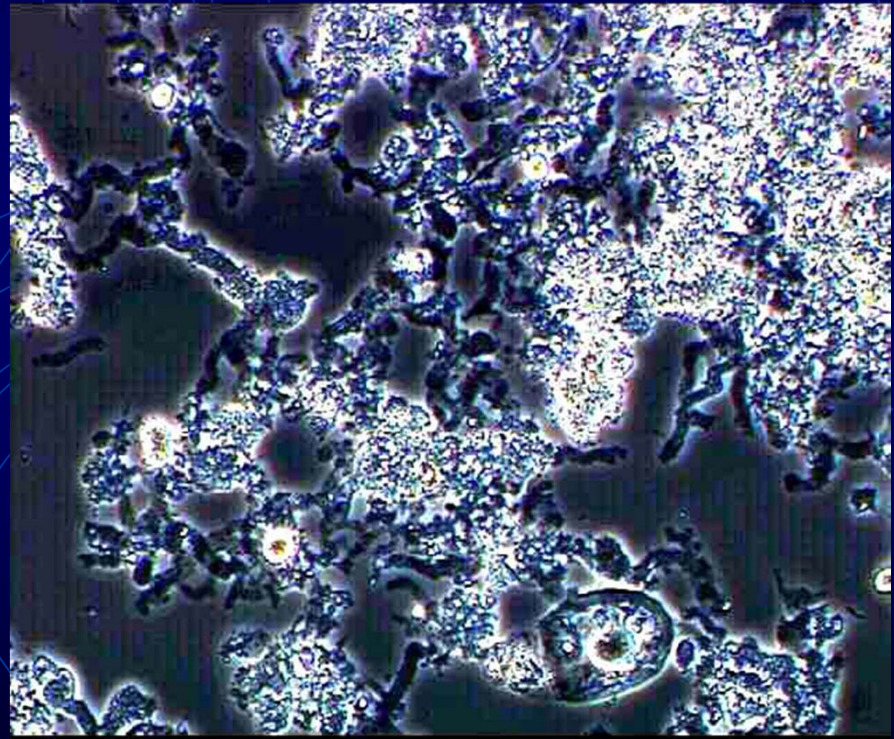
Dose	NTU
0	1.4
2	2.6
5	6.5
15	25.1

LABORATORY BENCH TESTS

Literature Search: **ACTIVATED SLUDGE GOOD FLOCCULATION**

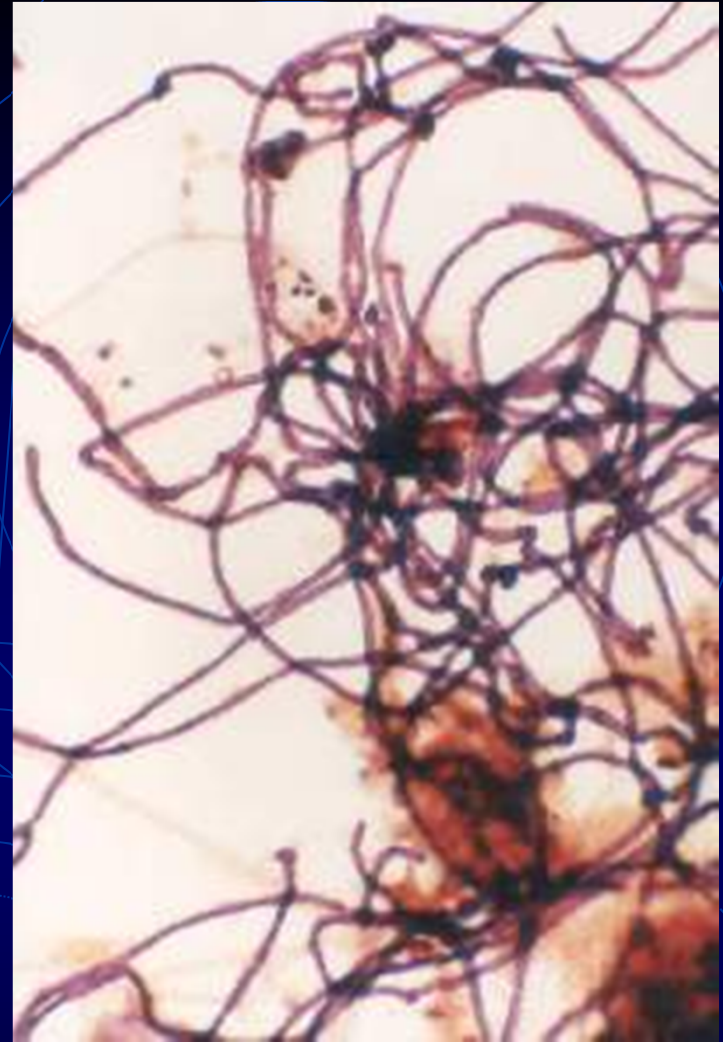
Virginia Polytechnic Papers

- **Aluminum or Iron**
- **RAS Chlorination**
- **Divalent Cations**



Literature Search: ACTIVATED SLUDGE DEFLOCCULATION

- **Glutathione-gated Potassium Efflux (GGKE)**
- **>2:1 Monovalent Cations vs Divalent Cations**
- **Sulfides**
- **Certain Other Electron Donor Compounds**



THE SMOKING GUN

Cured-in-Place Pipe Lining Process (CIPP)



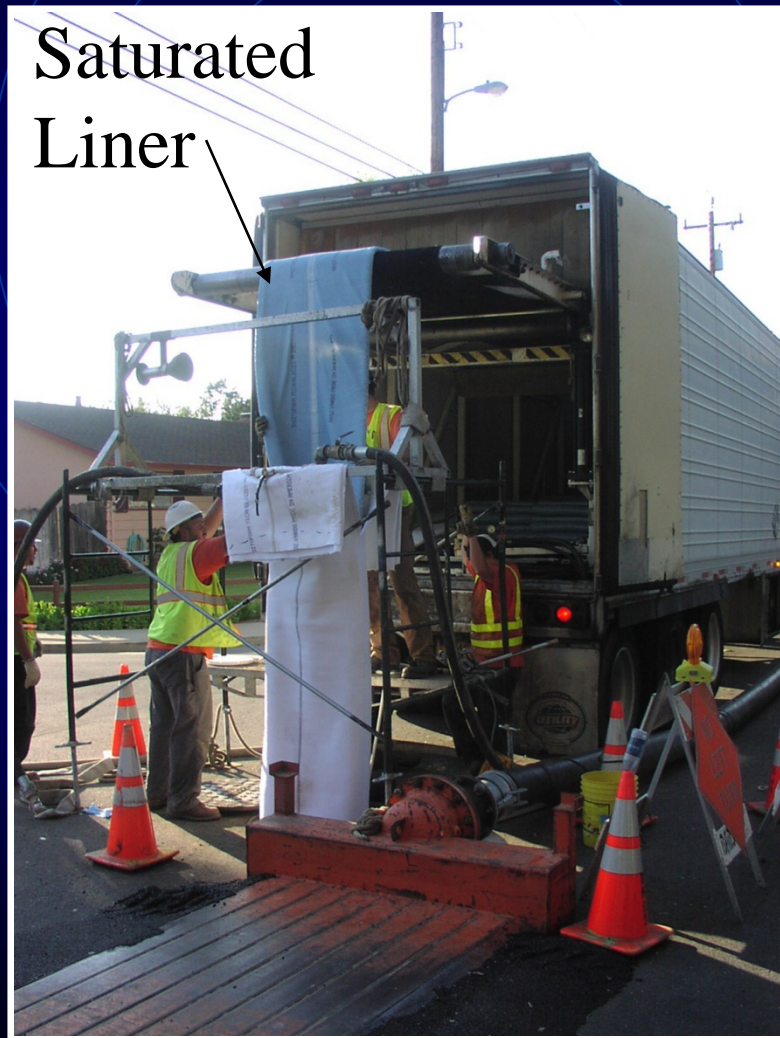
Cured In Place Pipe (CIPP)

- What is CIPP?
- CIPP installations and curing process
- Sanitary sewer discharges associated with CIPP
- Problems encountered at Central San
- Source Control response

What is CIPP?

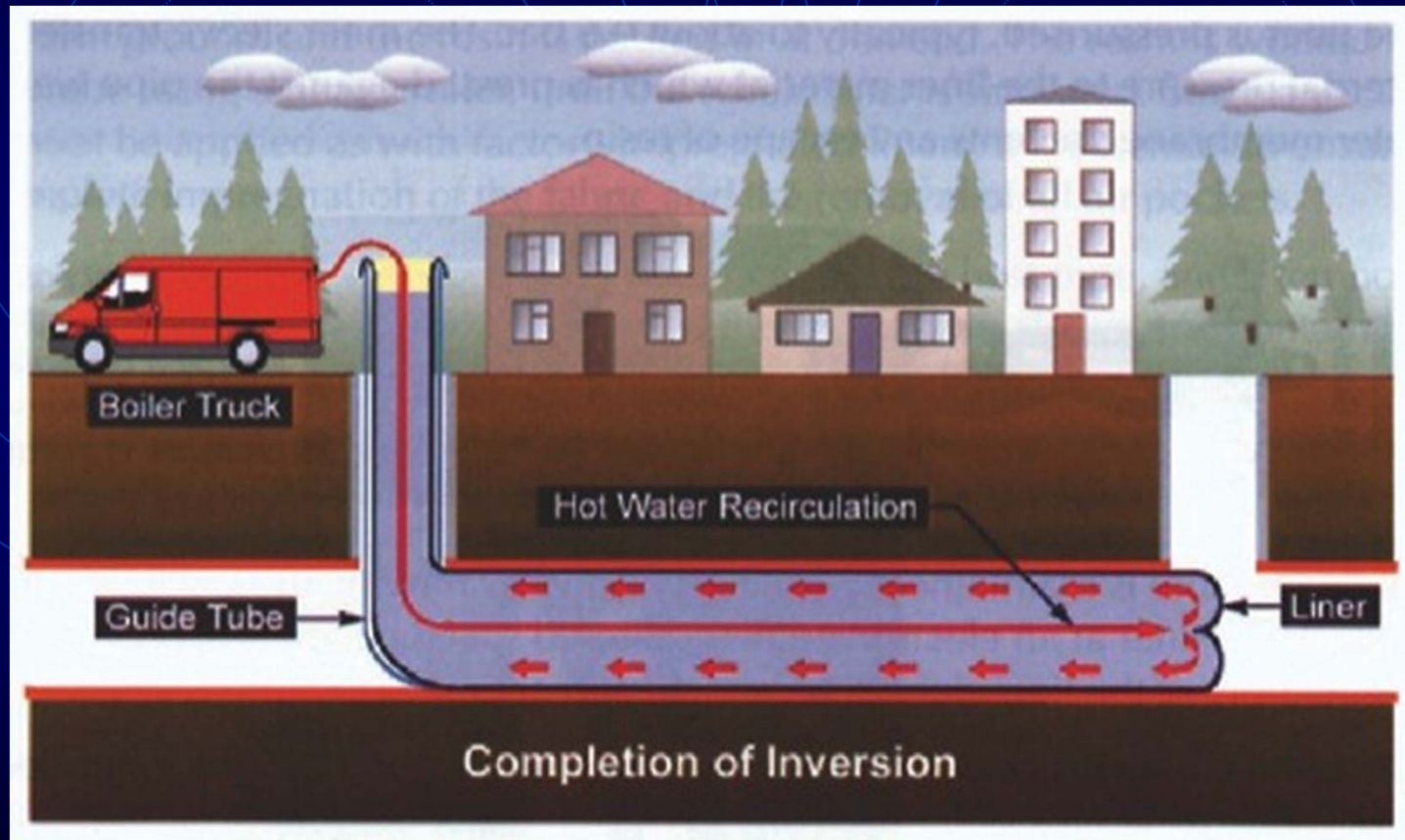
- Trenchless pipe liner used to rehabilitate sewer lines
- Liner is made of a non-woven fabric
- Installed using air or water to invert the liner
- Cured (hardened) using steam or hot water
- Liner is saturated with a resin (usually made from Styrene) which cures when heated

CIPP Installation



Inversion of liner inside pipe

Curing Process





Curing Process

- Liner is heated using steam or water
- Liner is cooked for several hours at a specified temperature
- Once cured, residual water is cooled and released by harpooning the liner

Cooking the Liner

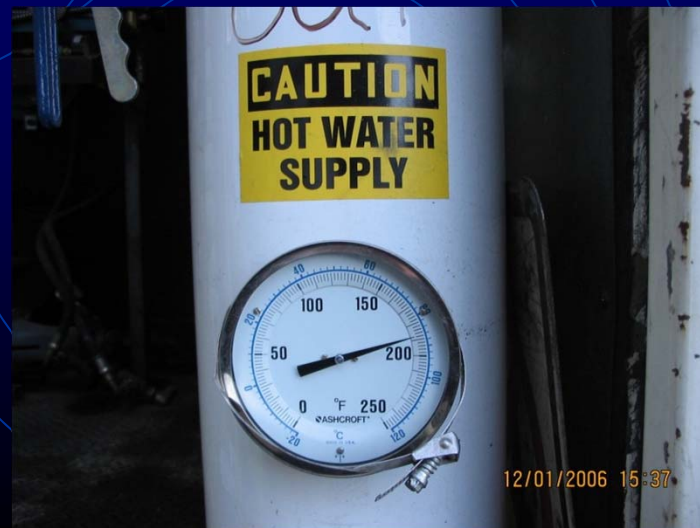


Cured Liner



Sanitary Sewer Discharges During CIPP installations

- Sewer line cleaning
 - Heavy solids release
- Cure water release
 - Resin laden water, Styrene
 - Hot water
 - No pretreatment



Problems Encountered at CCCSD Treatment Plant

Deflocculation
of sludge



Increased
Turbidity



Decreased
UV Lamp
efficiency

Plant turbidity problems coincided with CIPP installations in the Collection System

Source Control Response

- Sampled during initial release of cure water
 - 33 milligrams/liter Styrene detected
- Shut down CIPP installations
- Required contractor to cool and pretreat wastewater prior to release
- No further problem at Treatment Plant

2005 HIGH TURBIDITY INCIDENT

- **Treatment Plant began experiencing problems**
- **No CIPP projects in Central San's service area**
- **City of Concord - CIPP Project using Styrene**
- **Shut down project – plant problems ceased**
- **Allowed metered flow – turbidity returned**
- **Issued Special Discharge Permit to the project**
 - required pretreatment (carbon filters)**
- **High turbidity at plant did not return**

Activated Carbon Treatment



Current Practices at CCCSD to Manage CIPP Discharges

- **Bid Document Specifications:**
 - **CIPP contractors must collect and either pretreat wastewater prior to discharge or transport to off-site facility**
 - **Styrene concentrations must be less than 2.10 ppm (Total Toxic Organic limit) to discharge to Plant**
- **CCCSD's list of Total Toxic Organics amended to include Styrene**

Current Practices at CCCSD to Manage CIPP Discharges

- **Source Control Permit for CIPP discharges:**
 - Contractors plug downstream sanitary sewer line during entire CIPP process
 - Sample pretreated wastewater each day of discharge
 - Sample “mid-point” on pretreatment system to test for “break-through”
- **Source Control Permit for CIPP zero discharge:**
 - Contractors plug downstream sanitary sewer line during entire CIPP process
 - Document disposal of CIPP wastewater

Conclusions

- **Be aware of CIPP installations in your collection system**
- **Discharges from CIPP can be controlled at the source**
- **Styrene may be a pollutant of concern**
- **Questions?**

Pretreatment investigations involving discharges from Cured in Place Pipe (CIPP) installations

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