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CLEAR CREEK SYSTEMS, INC.

AN OVERVIEW OF
ACTIVE TREATMENT SYSTEMS
AS A BMP FOR
CONSTRUCTION STORMWATER



Presented By:
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Presentation Overview

- I. Description of ATS
- II. Capabilities and Limitations
- III. Design Considerations
- IV. Operating Environment
- V. Costs

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What Is Active Treatment?

Using polymers or electric current to coagulate, flocculate, and filter fine sediments from stormwater



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Other Components

- Means of Moving the Water
- Method for Treated Sediment to Settle
- Filters for Security and Polishing
- System Controls and Monitoring

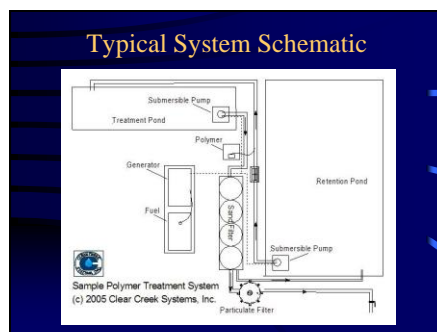
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Aquatic Impacts of Turbidity

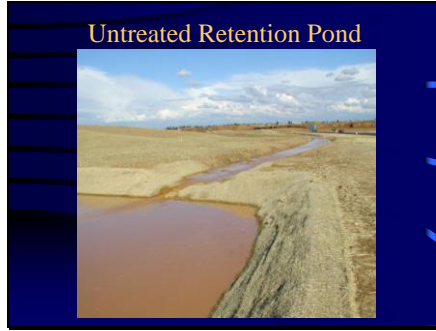
Duration	Turbidity Levels <i>at or above</i> which Adverse Effects are estimated to occur to Clear Water Fish (NTUs)		
	Slight impairment (behavioral effects)	Significant effects (to growth and habitat)	Severe impairment (habitat alienation)
1 hour	38	160	-
2 hours	28	120	-
3 hours	23	100	-
8 hours	15	65	-
24 hours	10	39	440
5 days	5	19	215
3 weeks	3	10	115
>10 months	-	3	35

Source: Newcombe, 2003, in OR DEQ 2005

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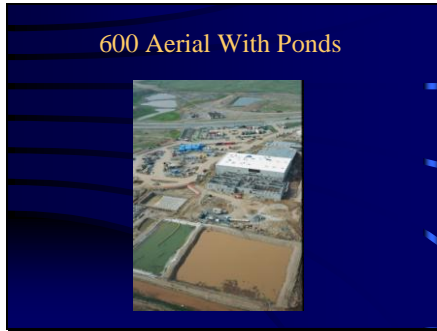
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Capabilities

- Clean Water
 - Reliable compliance with Basin Plan
 - Eliminates uncertainty of compliance
- Options in Construction Planning & Timing
- Very Effective Over Wide Range of Water Quality
- Highly Scalable For All Sizes of Sites
- Turbidity from 10 NTU to over 6,000 NTU

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Active Treatment Effectiveness

Typical Projects Utilizing ATS					
Project Location	Average Background	System Size (GPM)	Coagulant	Average Influent Turb. (NTU)	Average Effluent Turb. (NTU)
Kammerer Lane	90.2	1800	Chitosan	1517	15
Pleasant Grove Creek	4.34	600	Chitosan	1088	1.8
North Slough Creek	49.53	600	Chitosan	399	16
Rancho Cordova, CA	29.6	600	Chitosan	409	2.49
Oceanside, CA	196	200	Chitosan	255	0.5
Roseville CA	33	2400	Chitosan	893	2.5

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Limitations

- Evolving Processes and Designs
 - Originally, equipment and process adapted from industrial and municipal systems
 - Beginning to be better adapted to stormwater
- Chemicals also Came from Municipal Systems
- Uses Mechanical Equipment and Controls
- Sediment Has to Go Somewhere
- Not a Substitute for Erosion Control
 - The dirt volume adds up quickly

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Design Considerations—Polymer

- Chitosan
- PAM
- DADMAC
- Alum



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Operating Environment

- Trained Personnel
 - Only needed when it rains
- Harsh Weather Conditions
- Access
- Safety
- Maintenance
- Monitoring
 - Functionality, testing, record keeping
- Sediment Handling
- Regulatory Requirements

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Proposed Regulatory Requirements California

- Must Notify Regional Board
- Must Be Able to Test for Any Materials Used
- Detectable Limit of Test Must Be Below MATC
- “Qualified Personnel” Must Monitor
- 15 NTU Effluent Limit

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Regulatory Requirements Washington

- Product & Method Specific “Approval”
- Volunteer committee Review (CTRC)
- Site Must Have “Certified” Operator Onsite
- Continuous Monitoring for Turbidity & pH
- 10 NTU Effluent Limit

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Proposed Regulatory Requirements US EPA

- Work In Progress
- Appears To Existing Program Standards
- 13 NTU Limit
- Potentially Applicable To Sites That Meet 3 Main Requirements:
 - 30 Ac. or greater
 - R-Factor of 50 or greater
 - 10% or Greater Clay Content

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Economics

Typical Projects Utilizing AIS

Project Location	Project Size (Ac)	System Size (GPM)	Coagulant	Range Effluent Turb. (NTU)	Effluent Turb. (NTU)	Cost/Acre
Kammerer Lane	105	1800	Chitosan	548-4792	15	\$3,267.00
Pleasant Grove Creek	20	600	Chitosan	846-1780	1.8	\$6,000.00
Lincoln CA	40	600	PAC	300-800	23	\$2,883.00
Roseville CA	800	2400	Diatom	600-1000+	12	\$ 750.00
Oceanside, CA	8	200	Chitosan	210-331	0.5	\$3,775.00
Roseville CA	400	2400	Chitosan	365-1420	2.5	\$1,758.00
