



Advanced Treatment and Water Quality

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**Webinar Broadcast from LADWP's Central District Headquarters
Wednesday, May 26, 2010, 9:00 A.M. – 11:00 A.M.**

<https://www1.gotomeeting.com/register/763860689>





Agenda

- Welcome & Webinar Logistics
- Treatment Process Overview
- Introduction of Dr. Parekh
- Fundamentals of Advanced Water Treatment
- Constituents of Emerging Concern
- *Questions & Answers Session 1*
- Microfiltration
- Reverse Osmosis
- Advanced Oxidation
- Advanced Treatment Pilot Study at DCT
- *Questions & Answers Session 2*



Treatment Process

Preliminary and Primary Treatment – removes up to 85% of organic and inorganic solids that settle out or float to the top.

Secondary Treatment – removes organics and suspended solids using beneficial microorganisms that feed on them.

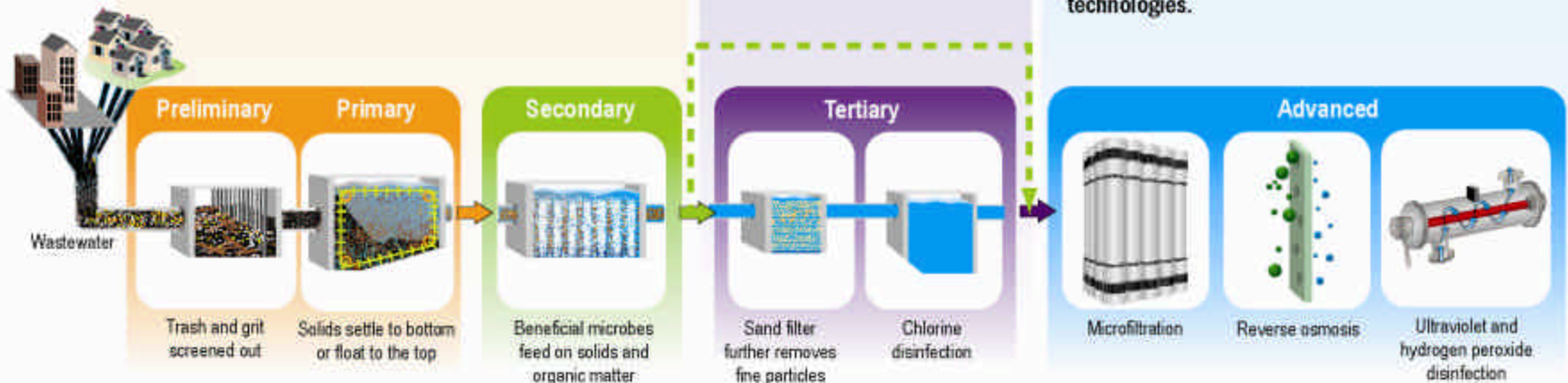
Tertiary Treatment – removes remaining solids with filtration through granular media (e.g., sand or anthracite coal); then applies chlorine to disinfect, killing bacteria, viruses, and other microorganisms.

Advanced Treatment

Microfiltration – removes organics and microorganisms.

Reverse Osmosis – removes additional salts and other very small molecules.

Ultraviolet and Hydrogen Peroxide Disinfection – destroys complex organic constituents that could not be completely removed by other treatment technologies.





Introduction – Dr. Pankaj Parekh

- City of Los Angeles’s Director for Water Quality
- Heads team of highly qualified engineers & scientists who engage in research studies and manage emerging issues regarding safe water
- UCLA Masters in Public Health & Doctorate in Environmental Science & Engineering



- Nationally recognized expert - drinking water security and emerging contaminant threats



Water Treatment Basics

- Microbes vs. Chemicals
- Destruction, Infectivity, Reproduction
- Physical vs. Chemical Removal



The Treatment Technology EXISTS



Constituents of Emerging Concern (CECs)

- Pharmaceuticals, personal care products, pesticides, etc.
- Emerging issue for water providers across the nation
- CECs are detected at low (or trace) levels in water
- The ability to detect a compound does not necessarily translate to human health concerns.
- Advanced engineered and natural treatments remove CECs to levels below detection.
- No standard testing methods currently exist.



Current Studies on CECs

SWRCB Blue Ribbon Panel on CECs in Recycled Water:

- *“Monitoring Strategies for Chemicals of Emerging Concern in Recycled Water – Recommendations of a Science Advisory Panel”*
- Draft Report Released April 2010
- Final Panel Meeting May 20-21, 2010
- ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/CECpanel/CA_CEC_RW_Draft_Report_2010Apr15.pdf

National Water Research Institute (NWRI) Study on CECs:

- *“Source, Fate, and Transport of Endocrine Disruptors, Pharmaceuticals and Personal Care Products in Drinking Water Sources in California”*
- Released May 19, 2010
- <http://www.nwri-usa.org/CECs.htm>



Chemicals of Emerging Concern (CECs)

Currently, no adverse human health impacts have been documented from exposure to extremely low concentrations of pharmaceuticals or personal care products found in water supplies

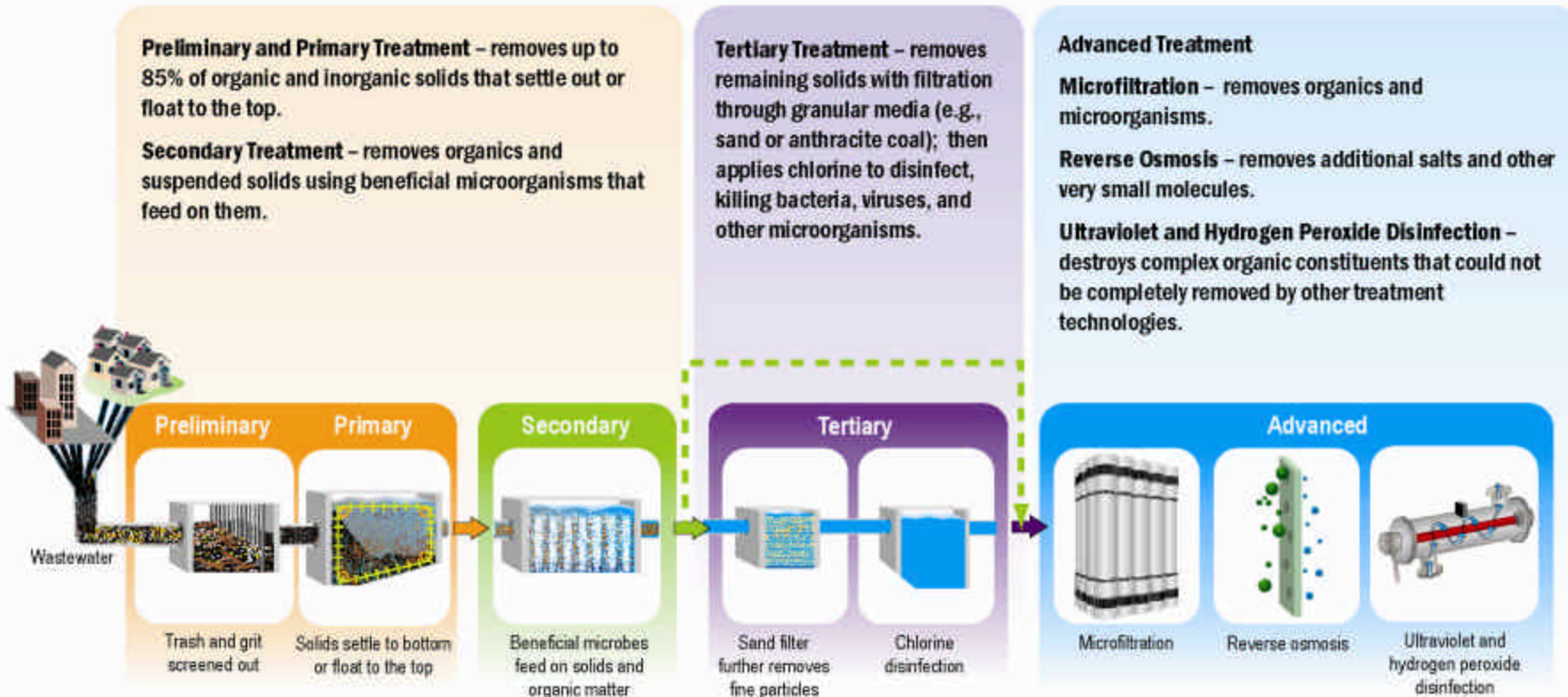


Questions & Answers

Session 1

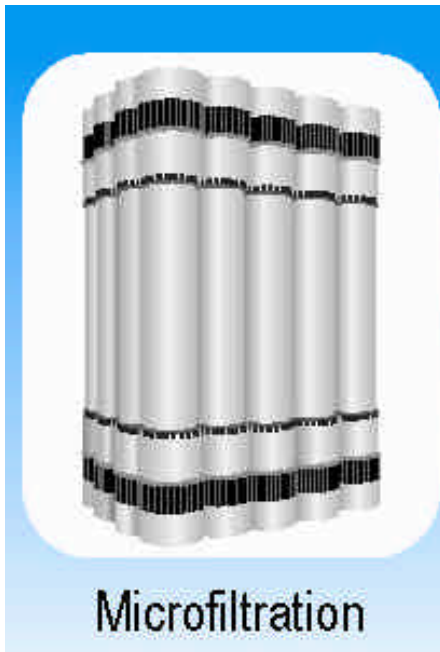


Treatment Process





Microfiltration



- Operating Range:
0.08 to 2.0 microns (μm)
- MF removes:
 - Total Suspended Solids (TSS) (97%)
 - Turbidity (>99%)
 - Protozoa and Bacteria (99.9%)
 - Viruses attached to suspended solids

[Video on Microfiltration](http://www.gwrsystem.com/about/micro.html)

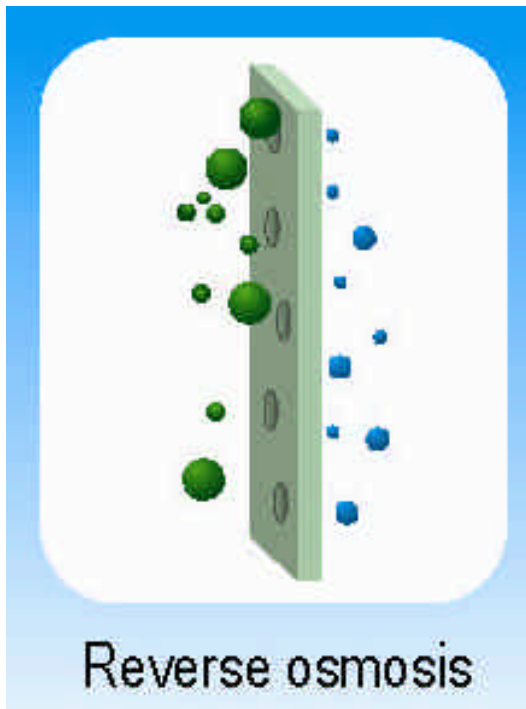
<http://www.gwrsystem.com/about/micro.html>

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Reverse Osmosis



- Operating Range:
0.0001 to 0.001 μm
- RO removes:
 - Remaining microorganisms
 - Color
 - Hardness
 - Ions, such as sulfate, nitrate, and sodium (>96%)
 - Organic carbon (94%)

[Video on Reverse Osmosis](http://www.gwrsystem.com/about/micro.html)

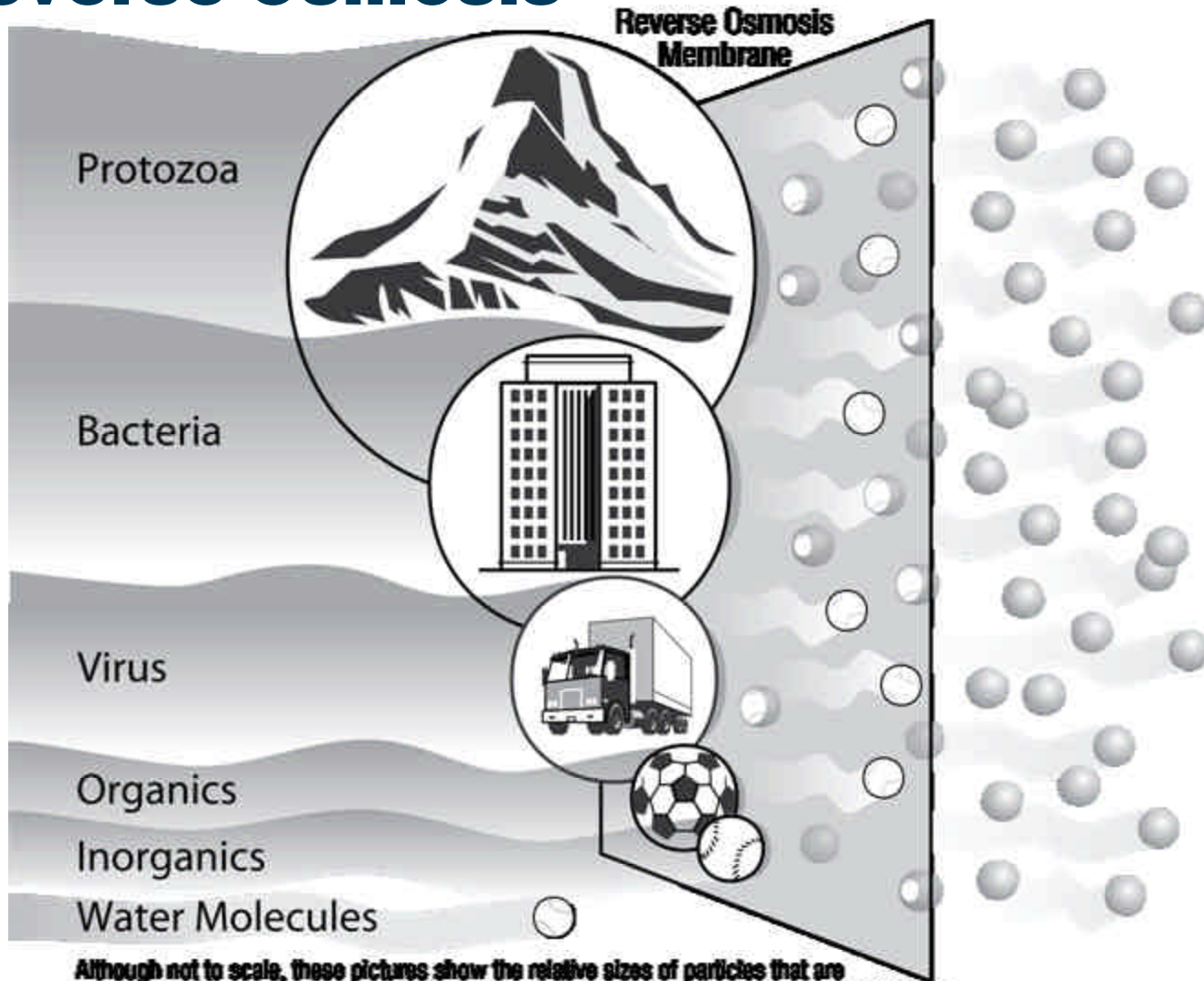
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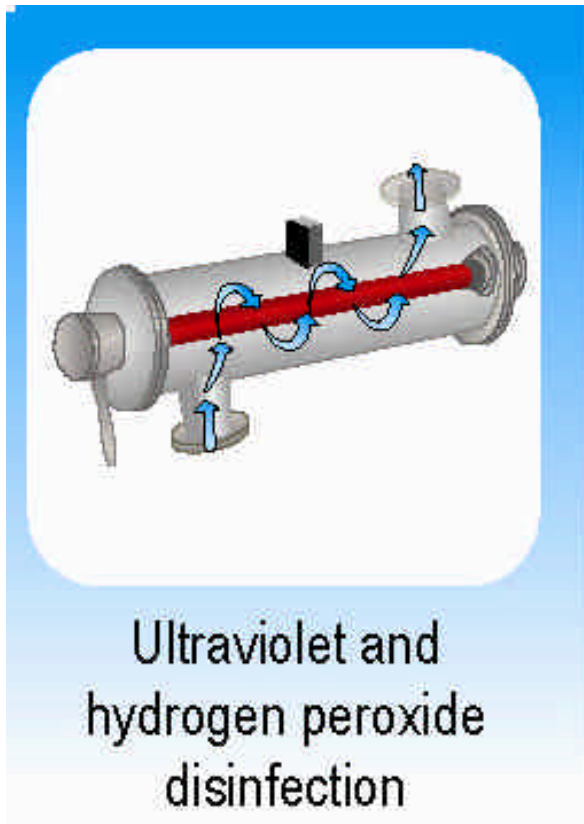
Reverse Osmosis



Although not to scale, these pictures show the relative sizes of particles that are blocked by the Reverse Osmosis Membrane. Water molecules soak through the membrane and collect on the other side as pure water.



Ultraviolet and Hydrogen Peroxide Disinfection



- Advanced Oxidation Processes (AOP)
- Breakdown of complex organic constituents that could not be completely removed by other treatment technologies.



Groundwater Replenishment Treatment Pilot Study: Testing Objectives

- “GWR” means Groundwater Replenishment
- Conduct realistic performance testing with DCT water
- Support regulatory requirement
- Increase working knowledge of advanced treatment processes
- Evaluate advanced oxidation alternatives
- Benchmark with existing AWT Facilities
- Develop design parameters



Groundwater Replenishment Treatment Pilot Study: Treatment Process

- Pilot location: Donald C. Tillman Water Reclamation Plant
- Began in February 2010
- Duration: 15 months
- Treatment Process:
 - Microfiltration
 - Reverse Osmosis
 - Ultraviolet Light With Hydrogen Peroxide Disinfection





In Closing



- Water Treatment Basics
- CECs
- Advanced Treatment Steps
- Pilot Study



Questions & Answers

Session 2