

Membrane Processes

- Reverse osmosis (RO)
 - primarily used to remove salts from brackish water or seawater desalination. Has a high rejection of synthetic organic chemicals (SOCs)
- Nano filtration (NF)
 - often used for water softening and to remove precursors to disinfection byproducts.
- Electrodialysis (ED)
 - demineralize brackish water and seawater, also water softening.
- Ultra filtration (UF)
 - turbidity and pathogen removal
- Micro filtration (MF)
 - turbidity and pathogen removal
- Cost of treatment increases as size of solute decreases

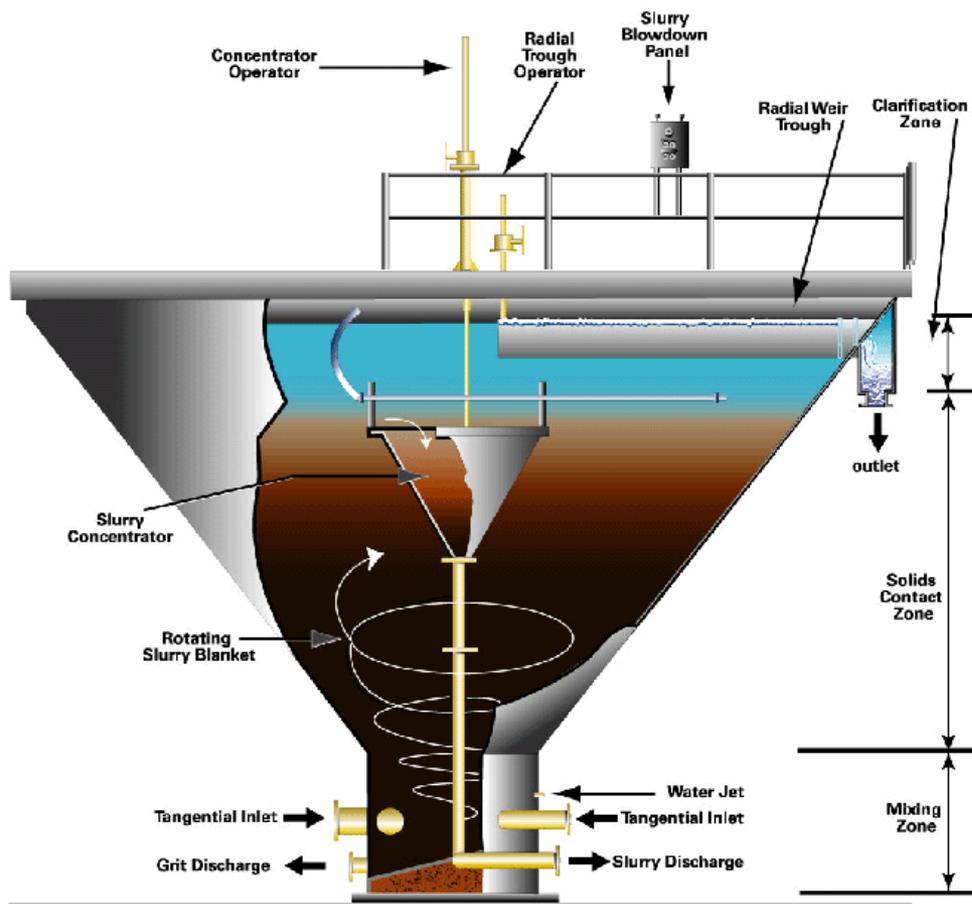
Membrane Processes

	IONIC RANGE		MOLECULAR RANGE		MACRO RANGE	MICRO PARTICLE RANGE		MACRO PARTICLE RANGE	
SIZE, MICRONS	0.001		0.01	0.1	1.0	10	100	1000	
APPROXIMATE MOLECULAR	100	1,000	20,000	100,000	500,000				
RELATIVE SIZE OF VARIOUS MATERIALS IN WATER	AQUEOUS SALTS		VIRUSES		BACTERIA		ALGAE		
	METAL IONS		HUMIC ACIDS		CLAYS		CYSTS		SAND
	MOLECULES		NOM		COLLOIDS		SILT		
							ASBESTOS FIBERS		
							SUSPENDED		
PROCESSES	REVERSE OSMOSIS PERVAPORATION				MICROFILTRATION				
	NANOFILTRATION						CONVENTIONAL FILTRATION		
	ELECTRODIALYSIS		ULTRAFILTRATION						
					COAGULATION				
			ACTIVATED CARBON						
									SAND, ACTIVATED CARBON (grains)

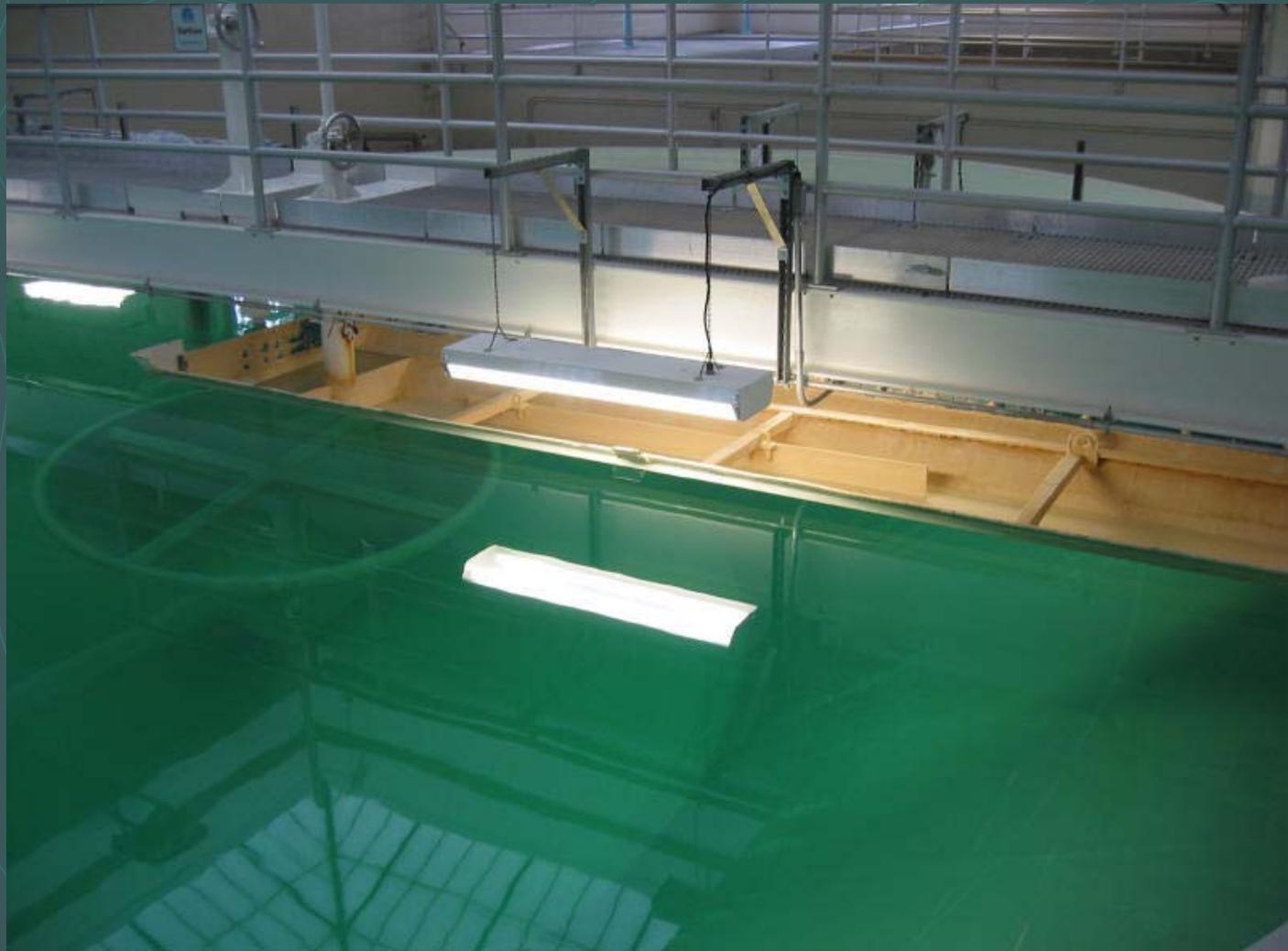
Boone Water Treatment Plant



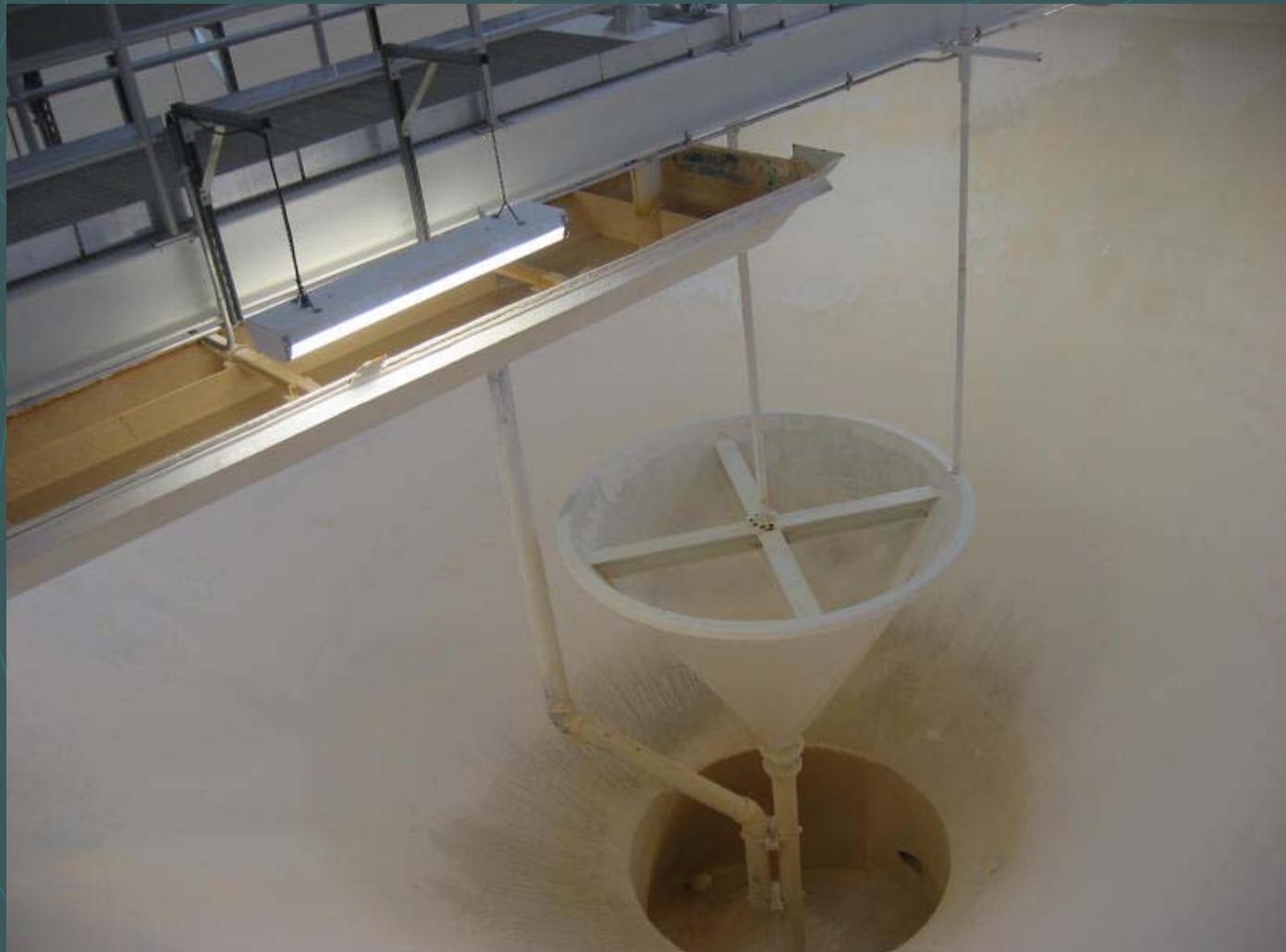
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Water Treatment Plants

