



### **Typical Starting Point**

- What makes up city water
- Typical Water Analysis
- Objectionable Items
- Seasonal and Source variations

### **Quality of USP PW/WFI**

- Final pretreatment water quality

### **Available Pretreatment Processes: Theory, Operation, Maintenance, Issues and Alternate processes**

- Micro and Ultra Filtration
- Carbon Filtration
- Water Softening
- CEDI/EDI/DI
- Reverse Osmosis
- Chemical Addition
- Ultraviolet Sterilization
- Ozonation
- Media Filtration
- Membrane Filtration

### **Scaling**

- Alkaline Scale
- Sulfate Scale
- Silica

### **Corrosion**

- Crevice Corrosion

### **Workshop**

- Given a particular situation or symptom, what is the solution

### **Examples Typical Pretreatment Configurations**