

# Drinking Water Regulation and Supply From a Utility Perspective

Presentation to the CCL Workgroup

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# Drinking Water Regulations

- Maximum Contaminant Level (MCL) regulations are set as close to MCLG (goal) as feasible
  - Accepted analytical methods
  - Health risk reduction and costs
  - Effects on sensitive sub-populations
  - Unintended consequences of compliance
  - Technical feasibility and data gaps
- If an analytical method is not feasible, a Treatment Technique (TT) can be required

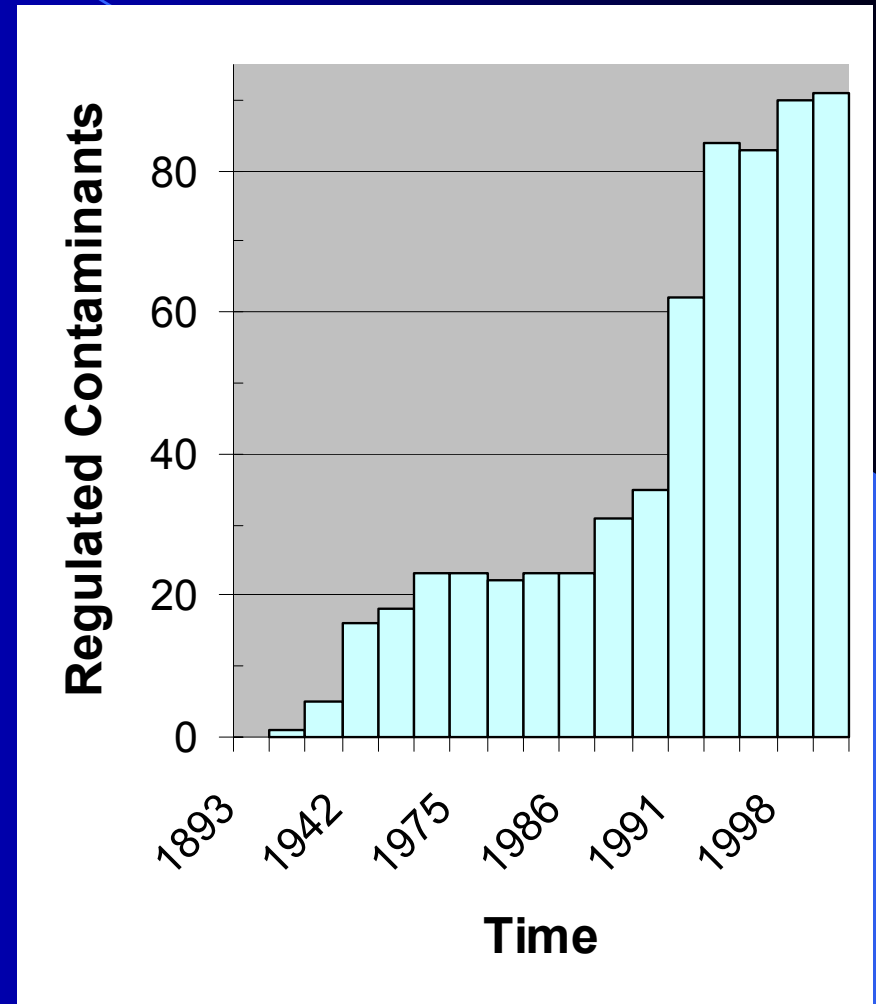
# Regulated Parameters

- **Maximum Contaminant Levels (MCL)**

*“... the maximum permissible level of a contaminant in water which is delivered to any user of a public water system.”*

- **Treatment Technique Requirement (TT)**

*“... If ... it is not economically or technologically feasible to so ascertain the level of such contaminant, each treatment technique... which leads to reduction in the level of such contaminant ...”*



# SDWA Standards Apply to Public Water Systems

- Public Water Systems – serve at least 15 connections
- USEPA sets national drinking water standards under SDWA and its amendments
- State agencies granted primacy for enforcement (except D.C. & Wyoming)
- State regulations must be at least as strict as federal standards
- Compliance is typically determined at entry to distribution system, but may be in distribution system or at customer meter

# How Many Public Water Systems are There?

- There are >165,000 PWSs serving >283 M people.
- Overwhelming majority are small.
- Systems serving > 10,000 persons serve 77% of U.S. population.

Public Water System		V. Small (25 - 500)	Small (501 - 3.3 K)	Medium (3.3 -10 K)	Large (10 - 100 K)	V. Large (>100 K)	Grand Total
CWS	# sys	30,703	14,331	4,606	3,436	361	53,437
	pop	5.0 M	29.2 M	26.7 M	96.3 M	119.5 M	267.7 M
NTNCWS	# sys	15,887	2,690	93	14	3	18,687
	pop	2.2 M	2.6 M	0.5 M	0.3 M	0.4 M	6.0 M
TNCWS	# sys	86,384	2,685	100	17	6	89,192
	pop	7.3 M	2.7 M	0.5 M	0.4 M	12.0 M	22.9 M
Total	# sys	132,974	19,706	4,799	3,467	370	161,316
	pop	14.6 M	25.5 M	27.7 M	100.0 M	131.9 M	296.6 M

Source: SDWIS Pivot Tables, EPA, downloaded Jan 31, 2003

# SDWA Standards Target Human Health Protection But Most Treated Water Is Not Consumed

Average Annual Water Demand per Connection (Thousand Gallons)					
System Size	Customer Category				
	Residential	Commercial/ Industrial	Wholesale	Governmental	Agricultural
Publicly Owned Systems					
<100	81	48	0	90	195
101 - 500	93	229	7,703	112	101
501 - 1,000	97	383	9,919	391	298
1,001 - 3,300	82	1,061	22,483	2,675	1,096
3,301 - 10,000	87	855	45,575	1,493	397
10,001 - 50,000	108	602	95,185	16,442	531
50,001 - 100,000	172	962	126,889	34,482	3,113
>100,000	177	1,052	632,135	74,566	3,830

Source: Overview of Community Water System Survey, EPA, 1997 (latest available)

# Types of Water Supply and Treatment

- Surface water systems typically employ more complex treatment than ground water systems

Number of Systems		
System Type	Ground Water	Surface Water
CWS	78%	22%
NTNCWS	96%	4%
TNCWS	98%	2%

Source: SDWIS Pivot Tables, EPA, downloaded Jan 31, 2003

**Percentage of Systems Applying Various Treatments at One or More Treatment Facilities**

	100% Ground Water	100% Surface Water
Aeration	33%	12%
Disinfection/Oxidation	92%	99%
Iron and Manganese Removal	34%	14%
Flocculation/Coagulation	33%	84%
Filtration	39%	89%
Organics Removal	27%	23%
Corrosion Control	36%	62%
Other	28%	12%

(where treatment is in place)

Source: CWSS, EPA, 1997

# Contaminant Monitoring is Not a Prospective Component of Public Health Protection

- Observation at a level above
  - detection
  - quantitation
  - level of health significance
- Frequency of monitoring
  - health endpoint of concern
- Threshold for action
  - public perception
  - health endpoint of concern
- Time required to test
  - Tests that allow real time response are few



# From Concept to Compliance

Is finished water quality meeting local, state, or federal expectations?

Design process allows the consideration of competing treatment objectives and available resources.

Time required varies with treatment challenge and ranges from a year to a decade.

Critical Path

- Data collection
- Alternative Evaluation
- Public Involvement
- Pilot Study
- Select Design Option
- Select Funding Mechanism
- Governing Body Approval
- Permitting ( $\leq 2$  yrs)
- Construction ( $\leq 5$  yrs)
- Shake Down (<6 mon)
- New facility in operation
- Compliance monitoring

# Designing for Contaminant Removal

- Select appropriate unit operations
- Fund (i.e., rates, local and state approvals)
- Public Involvement
- State Approval
- Construct
- Operating Regime
- Maintenance Practices



# Monitored Operational Parameters

- Operational criteria
  - Indicative of treatment performance
  - Easily monitored
  - Can be evaluated frequently or continuously

## **Not Regulated**

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- Chemical feed rates
- Conductivity
- Filter run length
- Hardness
- pH
- Pressure

## **Regulated But Also Monitored For Control**

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- Disinfectant residual
- Flow
- Turbidity

# Summary

- Time and process of planning/reacting to new regulations
- Process and capital magnitude of implementing facilities in reaction to new regulations
- Operational implications of new regulations