

Oklahoma Department of Environmental Quality
Water Quality Division

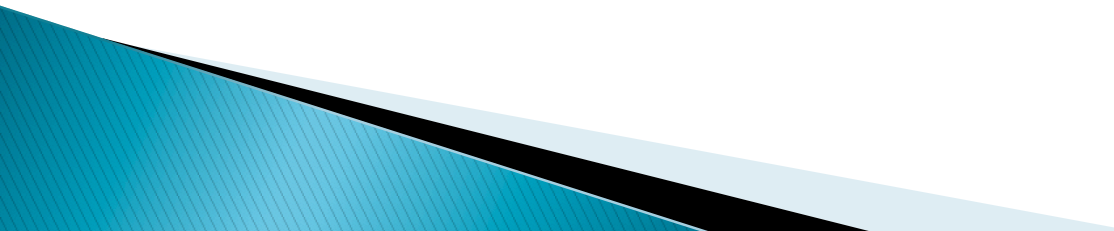
Water Reuse

Carl Parrott, P.E.



Water Reuse

History of Water Reuse Standards

- In 2010, representatives from a number of Oklahoma municipalities, through the Oklahoma Municipal League, expressed interest in using reclaimed water as a way to help conserve water due to the extreme droughts that Oklahoma has been experiencing.
 - These representatives met with the Oklahoma Department of Environmental Quality (DEQ) and a working group was formed with members from DEQ, various municipalities, technical experts from engineering firms, and the public.
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Water Reuse

History of Water Reuse Standards

- A review of other states' water reuse regulations and implementation methods along with input from our working group and technical experts helped DEQ create water reuse regulations that fit the State of Oklahoma.
- Water reuse regulations became effective July 1, 2012 and can be found online at

www.deq.state.ok.us/mainlinks/degrules.htm

OAC 252:656–27 Wastewater Reuse (Construction Standards)

OAC 252:627 Water Reuse (Operations Standards)

What is “Water Reuse”?

- ▶ **“Water reuse system”** means a treatment and distribution system designed to treat and supply reclaimed water.
- ▶ **“Reclaimed water”** means wastewater that has gone through various treatment processes to meet specific water quality criteria with the intent of being used in a beneficial manner. (OAC 252:656-1-2)
- ▶ **“Supplier”** means a person or entity that treats and provides reclaimed water pursuant to a permit issued by DEQ.
- ▶ **“User”** means a person or entity that uses reclaimed water. In those instances in which the supplier and the user are the same entity, the entity is a “supplier” subject to the provisions of OAC 252:627 Water Reuse.

Water Reuse

A Regulatory Perspective

- ▶ Wastewater to be reclaimed and reused was divided into four categories (2, 3, 4, & 5) with each category having specific treatment, reuses, testing frequencies, limits, and monthly reporting requirements.
- ▶ “Indirect Potable Reuse” would be classified as a Category 1 or Category 1(a). Category 1 had been reserved when water reuse regulations were first written.
- ▶ The DEQ and its Water Reuse Technical and Water Quality Committees are researching the possibility of “Indirect Potable Reuse” for the future.

Water Reuse

A Regulatory Perspective

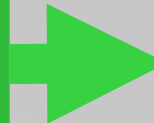
- ▶ “Categories” of water reuse were determined by several factors, including:
 - Final usage of the reclaimed water
 - Potential for human contact
 - Technology required to protect the environment and public health
 - Technology currently available at the wastewater treatment facility

Methods for Unplanned and Planned Potable Reuse

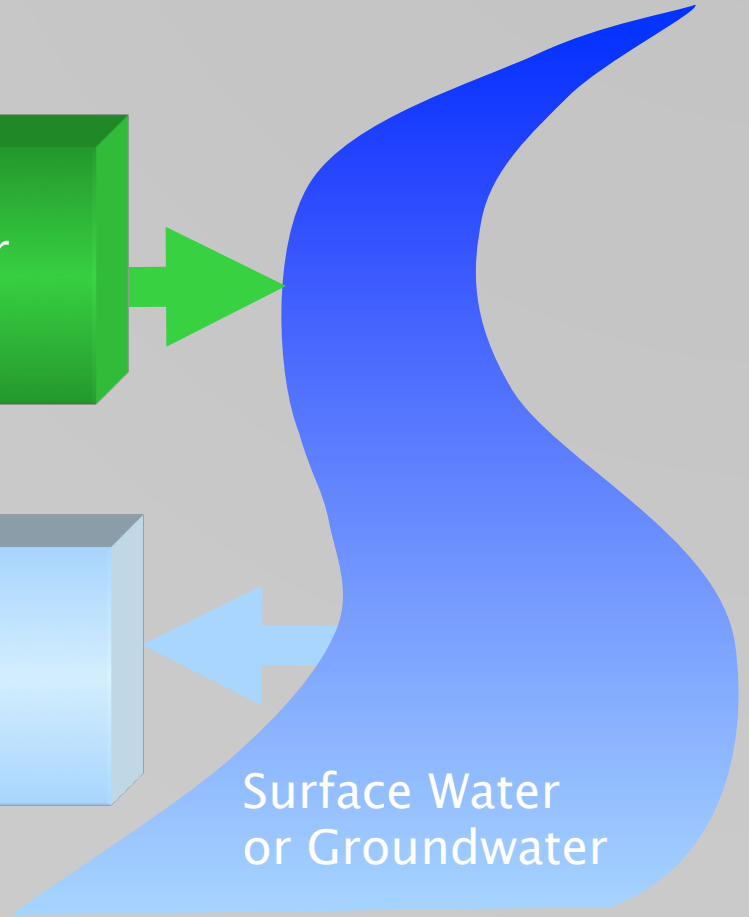
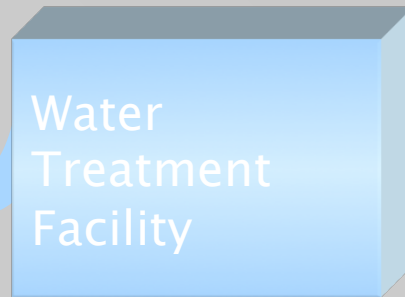
- ▶ Unplanned Indirect Potable Reuse
 - ▶ Planned Indirect Potable Reuse
 - ▶ Direct Potable Reuse
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Unplanned Indirect Potable Reuse

City A

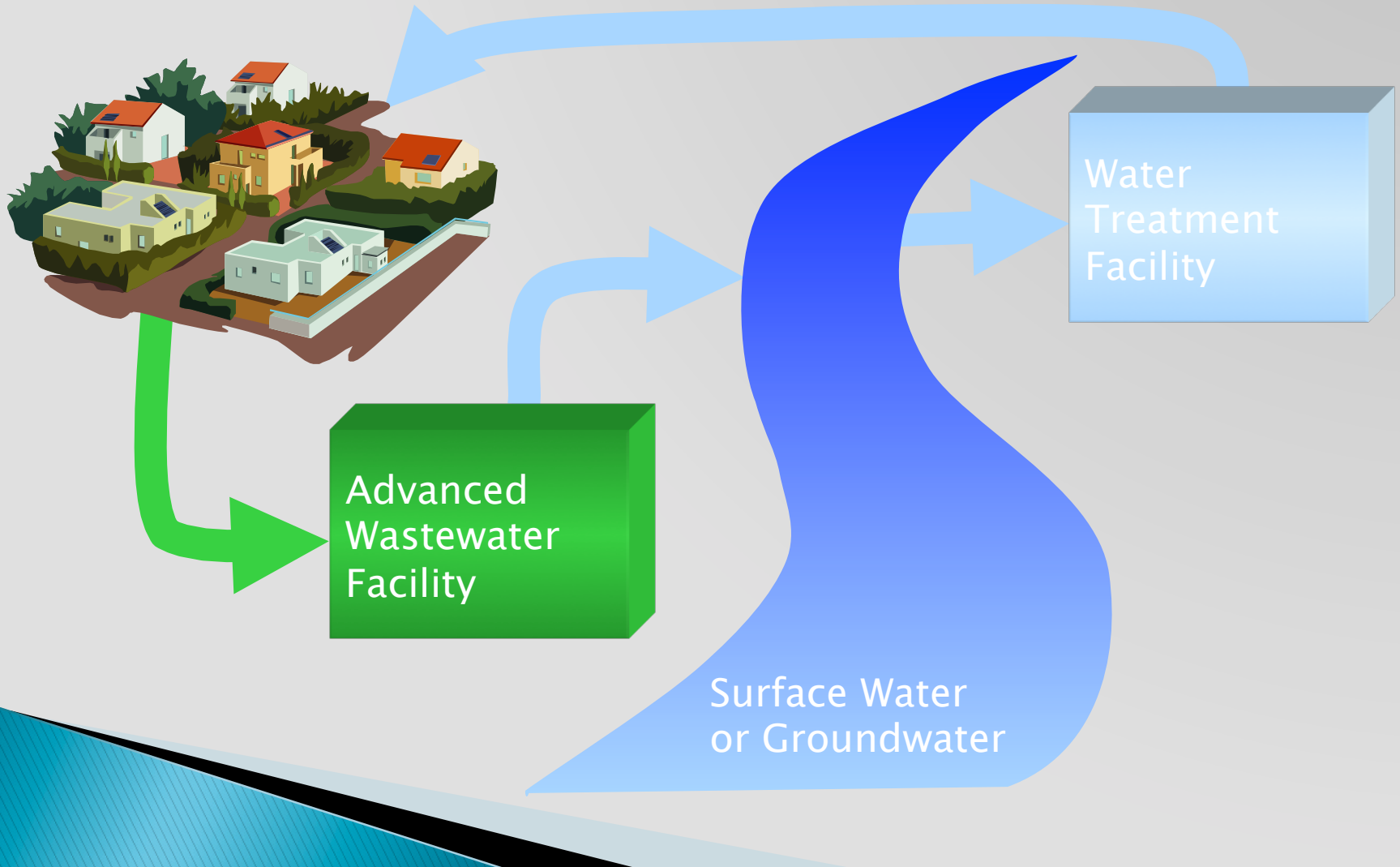


City B

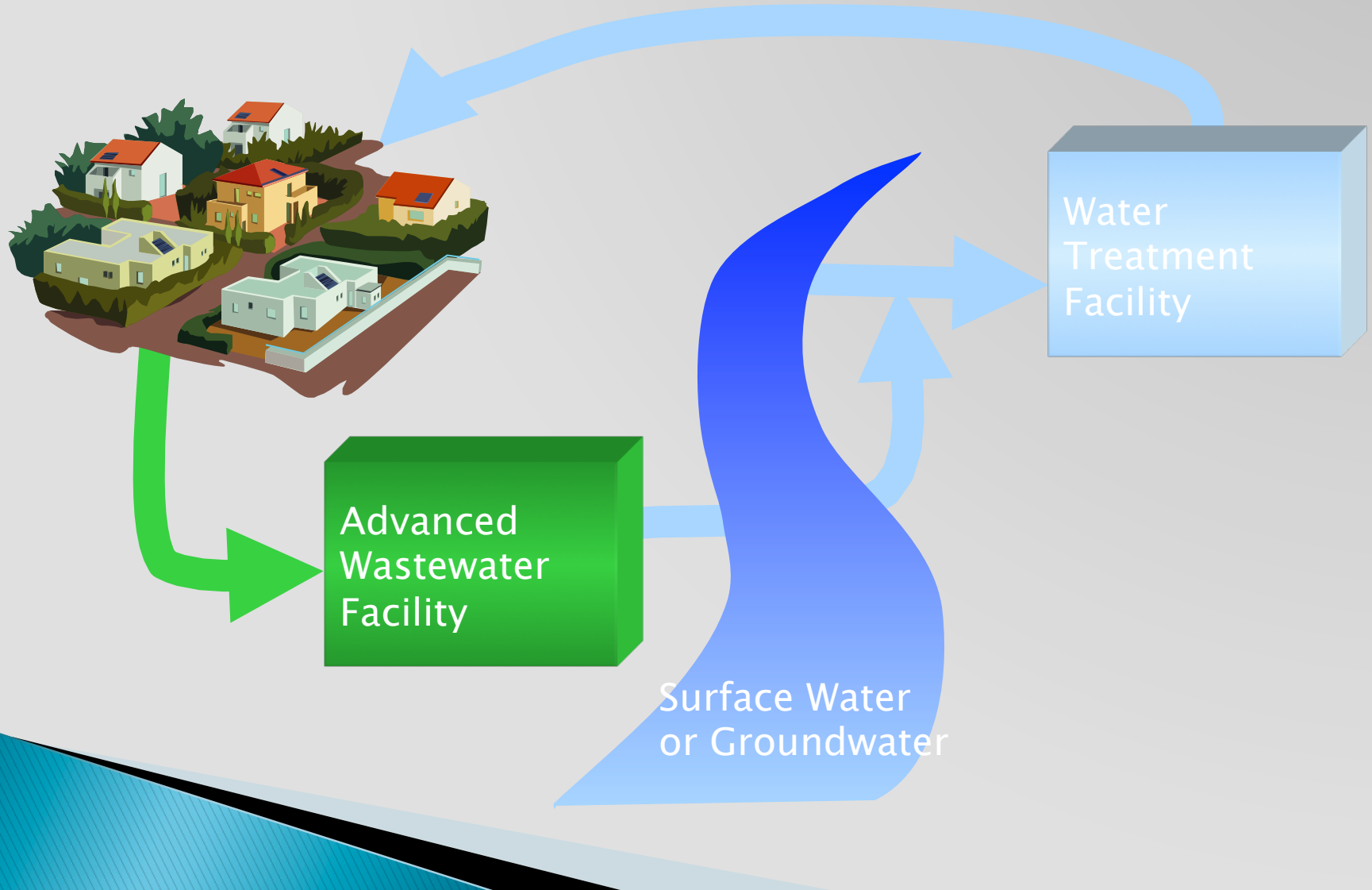


Surface Water
or Groundwater

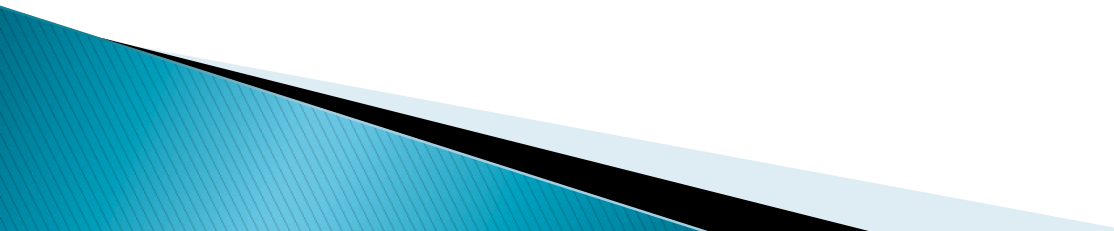
Planned Indirect Potable Reuse



Direct Potable Reuse



Methods for Non Potable Reuse

- ▶ Irrigation
 - ▶ Concrete mixing
 - ▶ Dust control
 - ▶ Industrial cooling towers
 - ▶ Toilet and urinal flushing
 - ▶ Fire protection
 - ▶ Vehicle washing
 - ▶ Range cattle watering
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Water Reuse

Categories of Reclaimed Water

Category	Treatment	Reuses
1	Reserved (for potable reuse)	
2	Secondary Treatment (nutrient removal, coagulation, filtration & disinfection)	Drip irrigation on orchards & vineyards; spray or drip on sod farms, public landscapes, golf courses, and toilets , fire protection, vehicle washing, and range cattle watering.
3	Secondary Treatment plus disinfection	Subsurface irrigation of orchards or vineyards; restricted access landscapes; livestock pasture, concrete mixing, dust control, restricted golf course
4	Primary Lagoon Treatment and Lagoon Storage plus disinfection	Soil compaction, similar construction activities, and restricted access golf course.
5	Primary Lagoon Treatment and Lagoon Storage	Restricted access pasture irrigation for range cattle, fiber, seed, forage, silviculture.

Category 2

Testing, Frequency, and Limits

Testing	Frequency	Limits
Turbidity	continuous	Not to exceed <ul style="list-style-type: none"> • daily average 2 NTU • 5 NTU > 5% of daily max per month • 10 NTU
Chlorine at POE	continuous	<ul style="list-style-type: none"> • free chlorine \geq 1.0 mg/l
Chlorine at EOP	weekly	<ul style="list-style-type: none"> • free chlorine \geq 0.2 mg/l or • combined chlorine \geq 0.50 mg/l
Fecal Coliform	daily	<ul style="list-style-type: none"> • No detectable organisms in 4 of last 7 daily samples • Single sample max \leq 23 cfu/100 ml
Nitrogen/Phosphorus	monthly	<ul style="list-style-type: none"> • \leq most stringent agronomic rate
CBOD5	weekly	<ul style="list-style-type: none"> • < 5.0 mg/l

Category 3

Testing, Frequency, and Limits

Testing	Frequency	Limits
Chlorine at POE	12 hours	<ul style="list-style-type: none">• free chlorine ≥ 0.2 mg/l or• combined chlorine ≥ 0.50 mg/l
Fecal Coliform	3/week	<ul style="list-style-type: none">• Monthly geometric mean of < 200 cfu/100 ml• Single sample < 400 cfu/100 ml
Nitrogen/Phosphorus	monthly	<ul style="list-style-type: none">• \leq most stringent agronomic rate
CBOD5	weekly	<ul style="list-style-type: none">• < 20 mg/l

Category 4

Testing, Frequency, and Limits

Testing	Frequency	Limits
Chlorine at POE	daily	<ul style="list-style-type: none">• free chlorine ≥ 0.20 mg/l or• combined chlorine ≥ 0.50 mg/l
Fecal Coliform	weekly	<ul style="list-style-type: none">• Monthly geometric mean of < 200 cfu/100 ml• Single sample < 800 cfu/100 ml
Dissolved oxygen	weekly	<ul style="list-style-type: none">• > 2.0 mg/l

Category 5

Testing, Frequency, and Limits

Testing	Frequency	Limits
none	none	none

Category 5 is required to maintain MORs (DEQ Form No. 627-MOR) on-site, reporting temperature, rainfall, start time, stop time, gallons reused, and site area in acres.

Water Reuse Priorities for Implementation

- ▶ This rule requires a “Permit to Supply”
- ▶ A facility with an existing Land Application Permit will be required to apply for a “Permit to Supply.”
- ▶ This rule will effect approximately 140 existing facilities with the following categories:

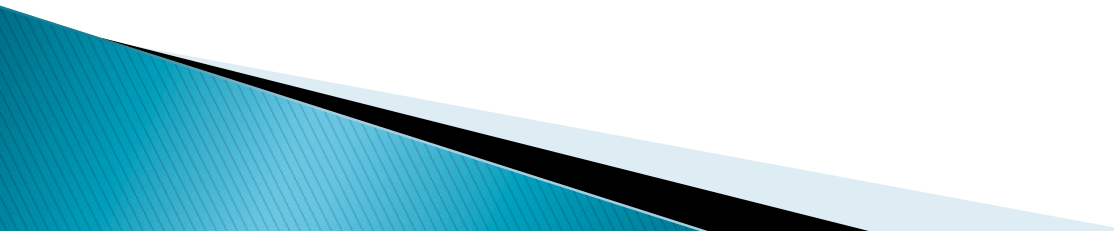
Category 3	less than 10 facilities
Category 4	less than 10 facilities
Category 5	125 facilities
- ▶ To put this on a five year cycle and to avoid issuing permits all at once, the DEQ will be sending letters to only 20% of existing permittees each year to apply for this permit.
- ▶ The Land Application Permit will serve as the “Permit to Supply” until you get a letter asking you to apply.
- ▶ Permits will then be renewed every five (5) years.

Water Reuse Reporting

- ▶ Monthly Operating Report (MORs)
 - DEQ Form 627-001
 - Fillable and savable online at <http://www.deq.state.ok.us/wqdnew/forms.html>
- ▶ Categories 2 and 4 must submit MORs to DEQ by the 15th of the following month and maintain copies on-site for three (3) years
- ▶ Categories 3 and 5 must maintain MORs on-site for 3 years
- ▶ Letters will be sent in July 2014 to notify facilities of reporting requirements

DEQ is continuing to develop rules for water reuse technologies not covered in our Construction Standards.

Water Reuse Regulatory Priorities for FY 2014

- ▶ Regulations being promulgated for FY 2014:
 - Traveling Bridge Filters
 - Disc and Cloth Filters
 - Ultraviolet Radiation (UV) Disinfection Systems
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Water Reuse

Regulatory Priorities for FY 2015

- ▶ Regulations to be introduced for FY 2015:
 - Indirect Potable Reuse
 - Direct Potable Reuse
 - Disinfection Technologies:
 - UV/peroxide
 - Ozone/peroxide
 - Onsite hypochlorite generation
 - Ozonation
 - Peracetic Acid (PAA)
 - Filtration Technologies
 - Membrane Bioreactors
 - Membrane Filters (Ultra, Micro, Nano, and Reverse Osmosis)
 - Oil & Gas water reuse for fracking

Purple Pipe

- ▶ All reclaimed water piping, valves, outlets and appurtenances in distribution systems shall be colored purple (Pantone 522).
- ▶ Existing systems will not be required to put in purple pipe, but will need to mark pipe with appropriate signage.

