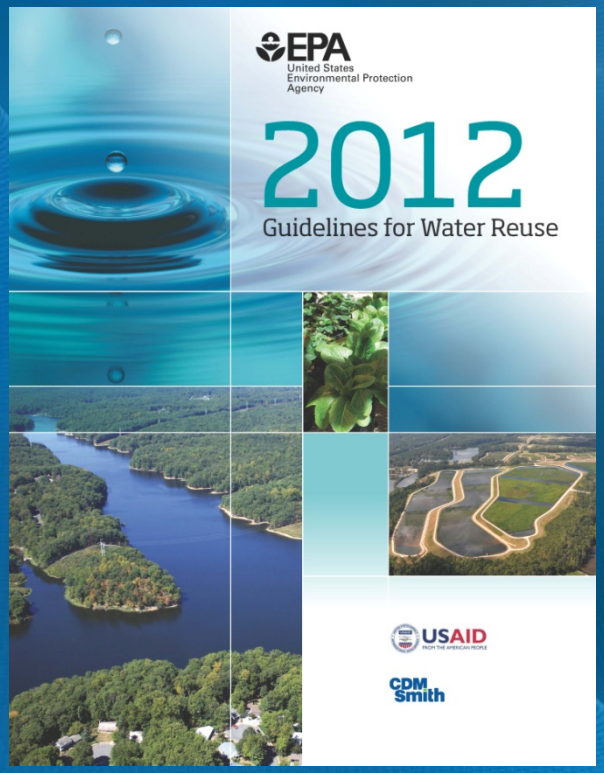
EPA GUIDELINES FOR WATER REUSE 2012 THE NEW GUIDELINES AND NEW JERSEY

AAEES/NJWEA Wesley Eckenfelder Memorial Breakfast



Paul R. Cabral, P.E.
CDM Smith

Allegra K. da Silva, PhD
CDM Smith

September 2012

EPA United States Environmental Protection Agency

USAID FROM THE AMERICAN PEOPLE

What Will You Know After 60-Minutes?

- EPA Water Reuse Guidelines - What and Why??
- Reuse in New Jersey and New York?

Federal Regulatory Framework

- There are no federal reuse regulations in the US
- EPA offers water reuse guidelines
- Reuse rules, guidelines and policies are implemented state-by-state
- 44 states have reuse regulations or guidelines
- 6 states reuse is reviewed on a case-by-case

History-EPA *Guidelines For Water Reuse*

- 1980:
  - First *Guidelines for Water Reuse* - Research Report by CDM for EPA Office of Research and Development
- 1992:
  - Updated for State Regulatory Use
- 2004:
  - UV disinfection alternative
  - Emerging contaminants
  - Case studies

2012 Contract Format/Sponsor Roles

- Contract –Cooperative Research and Development Agreement (CRADA)
- Federal Sponsors
  - USEPA
  - USAID
  - USDA/NIFA
- Additional Federal Agency Input:
  - Department of Energy (DOE)
  - Center for Disease Control (CDC)

Federal Sponsor Role

- USEPA
  - Active participant on management team
  - Staff participation as authors and reviewers
- USAID
  - Actively coordinating expansion of international chapter
  - Soliciting and editing international case studies
  - Supporting international workshops and consultations on reuse guidelines
- USDA/NIFA
  - Focused on water quality for food crop irrigation
  - Staff participation as authors and reviewers

Goals For 2012 *Guidelines For Water Reuse*

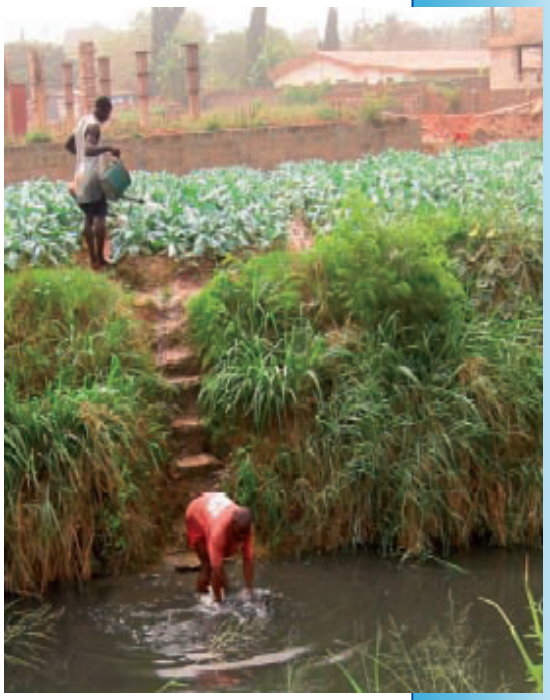
- Total water management approach
- Reflect integrated water resources management
- Recognize technology and regulations for higher quality
- Utilize current knowledge base and supplement with recent experience
- Increased focus on international project and best practices
- International development standards and guidelines (WHO, FAO, EU, IWA)

Drivers For 2012 *Guidelines For Water Reuse*

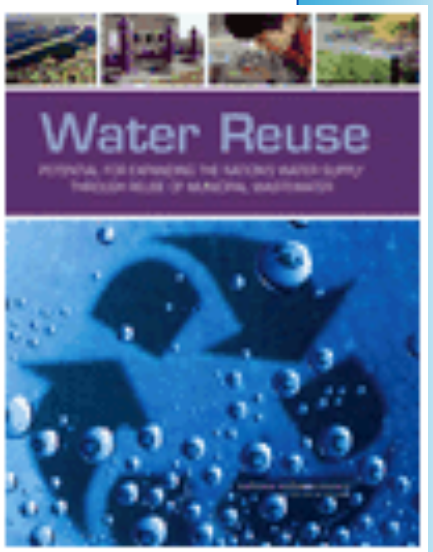
- Presidential Executive Order – EO 13514 -increased water and energy efficiency at federal facilities
  - Increase energy efficiency
  - Reduce greenhouse gas emissions
  - Conserve/protect water resources
  - LEED-certified facility criteria a measure of success
- Sponsor interest in updating guidelines
  - Address new applications and technology
  - Link to updated state regulatory information
- CWA/SDWA linkage to total water management

USAID Drivers For 2012 *Guidelines For Water Reuse*

- Document and share international case studies
- Share lessons learned, technologies, and approaches applicable across a wide spectrum of resource contexts
- Implementing WHO reuse guidelines and reducing health risks associated with reuse
- Create parallel guidelines document for in country USAID mission staff



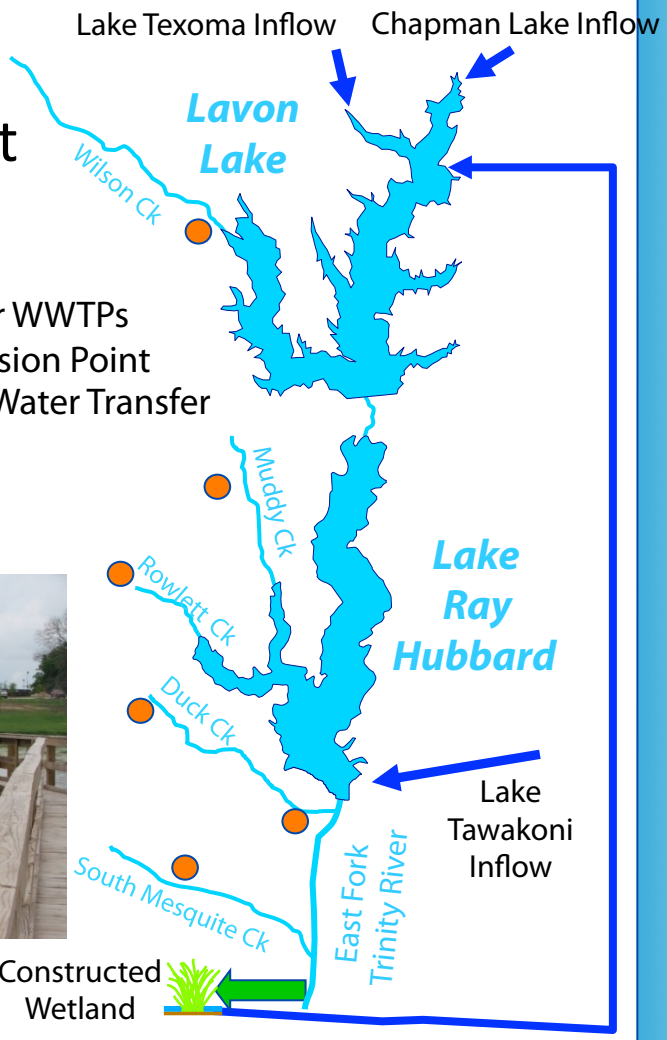
Additional Drivers For 2012 *Guidelines For Water Reuse*



- NAS Report (2012) *Water Reuse: Potential for Expanding the Nation's Water Supply Through Reuse of Municipal Wastewater*
  - Continuation of previous studies
  - Benefits to nations expanded water supply
  - Cost compared to other alternatives
  - Human health risk, including indirect potable reuse
  - Future research needs for safe implementation
- Wetland buffers to polish water
- Advanced treatment technologies to promote interest in IPR and DPR

Wetland Buffer Example – NTMWD East Fork Raw Water Supply Project

- North Texas Municipal Water District (NTMWD) East Fork Raw Water Project
- 1,800 ac manmade wetland system
- "Polishes" 90 MGD of effluent dominated water from East Fork of Trinity River
- Transfer to Lavor Lake

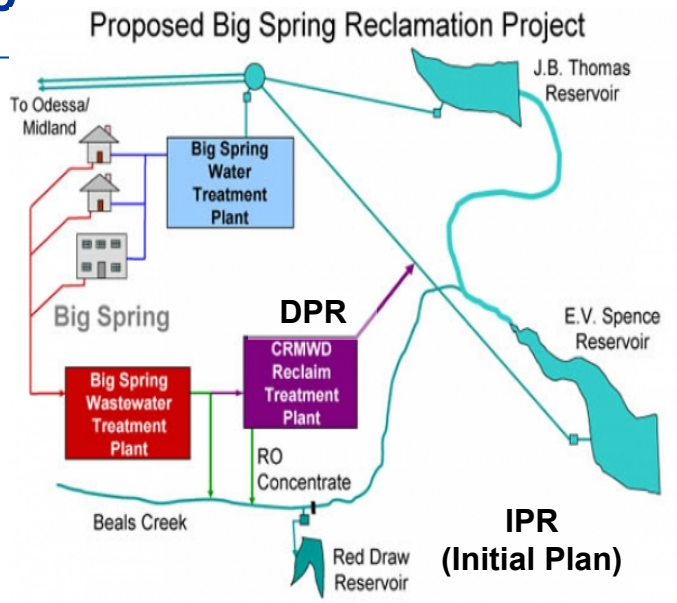


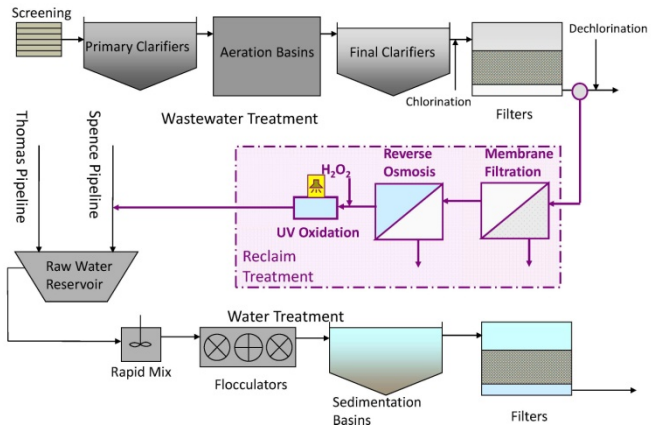
Indirect Portable Reuse Example – OCWD GWRS Project

- Orange Co Water District (OCWD) Groundwater Replenishment System (GWRS)
- Effluent Source: OCSD
- WRF Process: MF/RO/UV-A
- Capacity: 70 mgd
- Discharge Facilities:
  - Injection wells/seawater barrier
  - Percolation basins
- Cost: $485 Million
- Status: Operational in 2008

Direct Potable Reuse Example – CRMWD Raw Water Production Facility Project

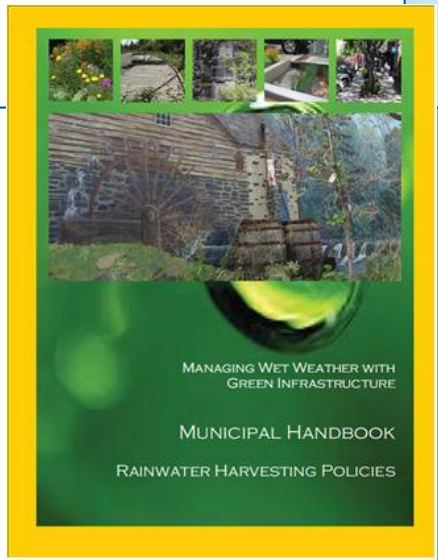
- Colorado River Municipal Water District(CRMWD) Raw Water Production Facility Project
- Capacity: 2 mgd
- WRF Process: MF/RO/UV-A
- WTP Process: Floc/Sed/Filter/Dis
- Discharge: WTP supply pipeline
- 10%-30% blend with lake water
- Cost: $14 Million
- Status: Operational in 2013
- 1st Direct Potable Reuse Facility in US



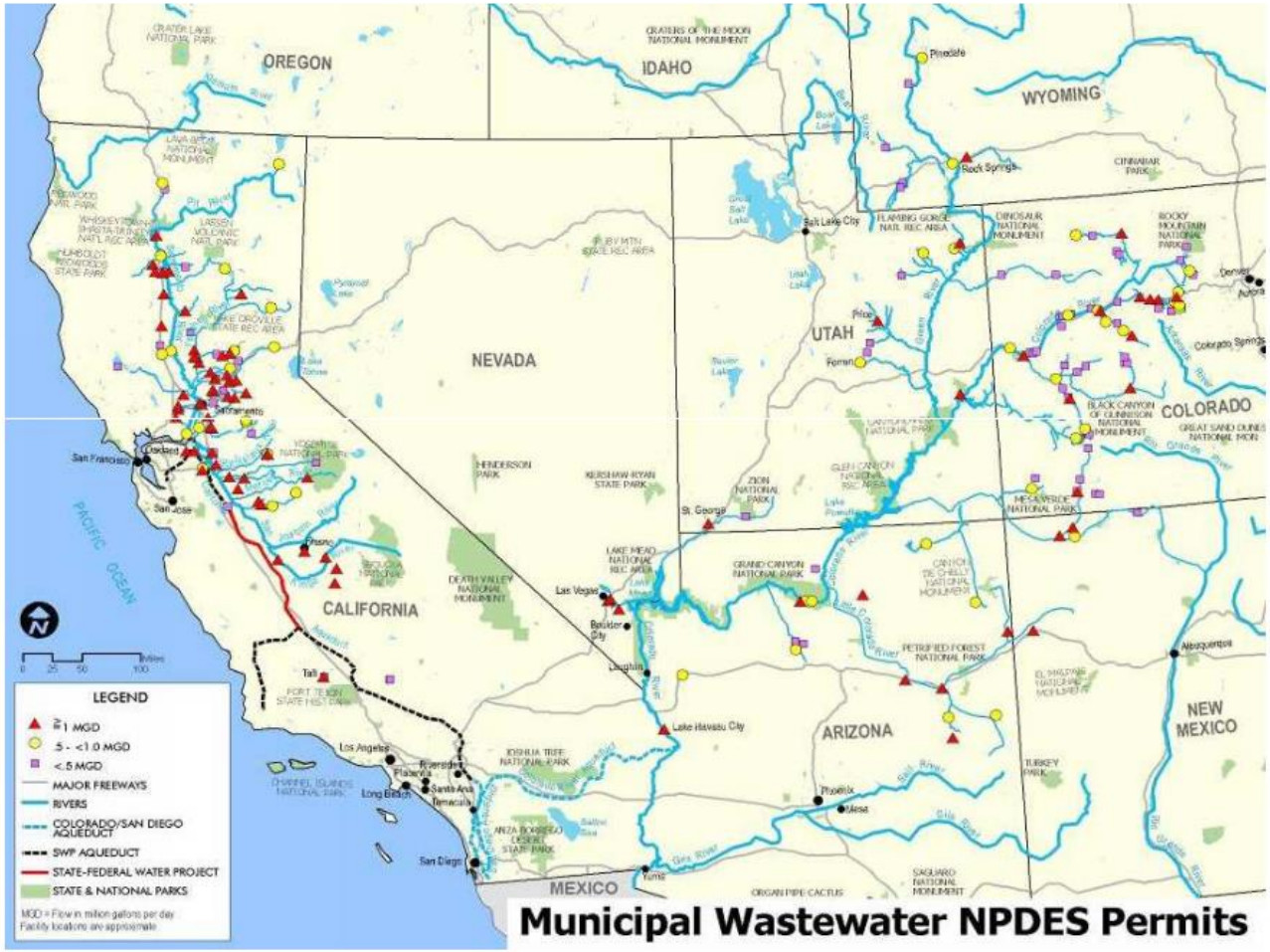


Expanded Coverage For 2012 Guidelines

- Onsite/decentralized reuse
- Graywater reuse
- Rainwater and stormwater capture
- Aquifer storage and recovery
- Additional industrial applications
- Water rights
- Public information/choice of words



Public Information and Choice of Words – San Diego Example



Courtesy City of San Diego and as presented within the "Trends In Indirect and Direct Potable Reuse In The United States" by George Tchobanoglous, July 18, 2013.

Public Involvement and Volunteer Participants

- Stakeholder input opportunities
  - WateReuse Symposium, Seattle, WA - 9/2009
  - WEFTEC, Orlando, FL - 10/2009
  - AWWA WQTC, Savannah, GA – 11/2010
- Project Management Team presentations
  - WateReuse Symposium, Phoenix, AZ - 9/2011
  - WEFTEC, Los Angeles, CA - 10/2011
  - WRA Potable Reuse Conf, Hollywood, FL – 11/2011
- 300+ volunteer contributors
- Over 100 case studies
- Update data/links to 43 state regulations/guidelines

PEER Review June 2012

- Guideline PEER Review Meeting in San Diego held on June 6
- PEER Review Committee Participants
  - Mark Andreini – U. Nebraska-Food for Water Institute
  - Bob Brobst - EPA
  - James Crook – Water Reuse Consultant
  - Shivaji Deshmukh – West Basin Utility District
  - Jim Dobrowolski - USDA/NIFA
  - Mark Elsner – Southwest Florida Water Management District
  - Bart Hines – Trinity River Authority
  - Carrie Miller - EPA
  - Julie Minton – WateReuse Research Foundation
  - Craig Riley – Washington Department of Health
  - Joan Rose – Michigan State University
  - Valerie Rourke – VA Department of Environmental Quality

SO…NOW WHAT?

Water Reuse Types in EPA Guidelines

- Agriculture
  - Food
  - Non-food
- Urban
  - Unrestricted Access
  - Restricted Access
- Impoundments
  - Unrestricted Access
  - Restricted Access
- Environmental/Wetlands
- Industrial
- Groundwater Recharge
- Indirect Potable
- Direct Potable (Coming Out via Supplement in 2015)

Suggested Regulatory Guidelines

Table 4-4 Suggested guidelines for water reuse

Reuse Category and Description	Treatment	Reclaimed Water Quality [2]	Reclaimed Water Monitoring	Setback Distances [3]	Comments
Urban Reuse					
Unrestricted The use of reclaimed water in nonpotable applications in municipal settings where public access is not restricted.	▪ Secondary[4] ▪ Filtration[5] ▪ Disinfection[6]	▪ pH = 6.0-9.0 ▪ ≤ 10 mg/l BOD [7] ▪ ≤ 2 NTU [8] ▪ No detectable fecal coliform /100 ml [9,10] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ BO ▪ Tu ▪ Fe ▪ Cl_2		▪ At controlled-access irrigation sites where design and operational measures significantly reduce the potential of n to achieve sites are erial
Restricted The use of reclaimed water in nonpotable applications in municipal settings where public access is controlled or restricted by physical or institutional barriers, such as fencing, advisory signage, or temporal access restriction	▪ Secondary [4] ▪ Disinfection [6] ▪	▪ pH = 6.0-9.0 ▪ ≤ 30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coliform /100 ml [9, 13, 14] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ BO ▪ TS ▪ Fe ▪ Cl_2		ncrete, worker 100 ml)
Agricultural Reuse					
Food Crops [15] The use of reclaimed water for surface or spray irrigation of food crops which are intended for human consumption, consumed raw.	▪ Secondary [4] ▪ Filtration [5] ▪ Disinfection [6]	▪ pH = 6.0-9.0 ▪ ≤ 10 mg/l BOD [7] ▪ ≤ 2 NTU [8] ▪ No detectable fecal coliform/100 ml [9,10] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ BO ▪ Tu ▪ Fe ▪ Cl_2		sites are
Processed Food Crops [15] The use of reclaimed water for surface irrigation of food crops which are intended for human consumption, commercially processed. ***Non-Food Crops*** The use of reclaimed water for irrigation of crops which are not consumed by humans, including fodder, fiber, and seed crops, or to irrigate pasture land, commercial nurseries, and sod farms.	▪ Secondary [4] ▪ Disinfection [6]	▪ pH = 6.0-9.0 ▪ ≤ 30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coli/100 ml [9,13, 14] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH – weekly ▪ BOD - weekly ▪ TSS - daily ▪ Fecal coliform - daily ▪ Cl_2 residual – continuous	▪ 300 ft (90 m) to potable water supply wells ▪ 100 ft (30 m) to areas accessible to the public (if spray irrigation)	▪ See Table 3-5 for other recommended chemical constituent limits for irrigation. ▪ If spray irrigation, TSS less than 30 mg/l may be necessary to avoid clogging of sprinkler heads. ▪ High nutrient levels may adversely affect some crops during certain growth stages. ▪ See Section 3.4.3 in the 2004 guidelines for recommended treatment reliability requirements. ▪ Milking animals should be prohibited from grazing for 15 days after irrigation ceases. A higher level of disinfection, e.g., to achieve < 14 fecal coli/100 ml, should be provided if this waiting period is not adhered to.

Example of Suggested Water Reuse Guidelines for Urban-Unrestricted Reuse (e.g., Golf Course Irrigation):

- pH = 6.0-9.0
- ≤ 10 mg/l BOD
- ≤ 2 NTU
- No detectable fecal coliform /100 ml
- 1 mg/l Cl2 residual (min.)

Suggested Regulatory Guidelines (Cont)

Table 4-4 Suggested guidelines for water reuse

Reuse Category and Description	Treatment	Reclaimed Water Quality [2]	Reclaimed Water Monitoring	Setback Distances [3]	Comments
Impoundments					
Unrestricted The use of reclaimed water in an impoundment in which no limitations are imposed on body-contact.	▪ Secondary [4] ▪ Filtration [5] ▪ Disinfection [6]	▪ pH = 6.0-9.0 ▪ ≤ 10 mg/l BOD [7] ▪ ≤ 2 NTU [8] ▪ No detectable fecal coliform/100 mi [9,10] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ BO ▪ Tu ▪ Fe ▪ Cl_2		▪ Dechlorination may be necessary to protect aquatic species of flora and fauna …sites are
Restricted The use of reclaimed water in an impoundment where body-contact is restricted.	▪ Secondary [4] ▪ Disinfection [6]	▪ ≤ 30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coliform/100 ml [9,13,14] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ TS ▪ Fe ▪ Cl_2		
Environmental Reuse					
Environmental Reuse The use of reclaimed water to create wetlands, enhance natural wetlands, or sustain stream flows.	▪ Variable ▪ Secondary [4] and disinfection [6] (min.)	Variable, but not to exceed: ▪ ≤30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coliform/100 ml [9,13,14] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ BO ▪ SS ▪ Fe ▪ Cl_2		
Industrial Reuse					
Once-through Cooling	▪ Secondary [4]	▪ pH = 6.0-9.0 ▪ ≤ 30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coliform/100 ml [9,13,14] ▪ 1 mg/l Cl_2 residual (min.) [11]	▪ pH ▪ BO ▪ TS ▪ Fe ▪ Cl_2 residual – continuous	▪ 300 ft (90 m) to areas accessible to the public. May be reduced if high level of disinfection is provided.	▪ Windblown spray should not reach areas accessible to workers or the public. ▪ Additional treatment by user is usually provided to prevent scaling, corrosion, biological growths, fouling and foaming. ▪ See Section 3.4.3 in the 2004 guidelines for recommended treatment reliability requirements.
Recirculating Cooling Towers	▪ Secondary [4] ▪ Disinfection [6] (chemical coagulation and filtration [5] may be needed)	Variable, depends on recirculation ratio: ▪ pH = 6.0-9.0 ▪ ≤ 30 mg/l BOD [7] ▪ ≤ 30 mg/l TSS ▪ ≤ 200 fecal coliform/100 ml [9,13,14] ▪ 1 mg/l Cl_2 residual (min.) [11]			
Other Industrial uses – e.g. boiler feed, equipment washdown, processing, power generation, and in the oil and natural gas production market (including hydraulic fracturing) have requirements that depends on site specific end use (See Chapter 3)					
Groundwater Recharge – Nonpotable Reuse					
The use of reclaimed water to recharge aquifers which are not used as a potable drinking water source.	▪ Site specific and use dependent ▪ Primary (min.) for spreading ▪ Secondary [4] (min.) for injection	▪ Site specific and use dependent	▪ Depends on treatment and use	▪ Site specific	▪ Facility should be designed to ensure that no reclaimed water reaches potable water supply aquifers. ▪ See Chapter 3 of this document and Section 2.5 of the 2004 guidelines for more information. ▪ For injection projects, filtration and disinfection may be needed to prevent clogging. ▪ For spreading projects, secondary treatment may be needed to prevent clogging. ▪ See Section 3.4.3 in the 2004 guidelines for recommended treatment reliability requirements.

Example of Suggested Water Reuse Guidelines for Industrial Reuse-Once Through Cooling:

- pH = 6.0-9.0
- ≤ 30 mg/l BOD
- ≤ 30 mg/l TSS
- ≤ 200 fecal coliform /100 ml
- 1 mg/l Cl2 residual (min.)

Suggested Regulatory Guidelines (Cont)

Table 4-4 Suggested guidelines for water reuse

Reuse Category and Description	Treatment	Reclaimed Water Quality [2]	Reclaimed Water Monitoring	Setback Distances [3]	Comments
Indirect Potable Reuse					
Groundwater Recharge by Spreading into Potable Aquifers	▪ Secondary [4] ▪ Filtration [5] ▪ Disinfection [6] ▪ Soil aquifer treatment	Includes, but not limited to, the following: ▪ No detectable total coliform/100 ml [9, 10] ▪ 1 mg/l Cl_2 residual (min.) [11] ▪ pH = 6.5 – 8.5 ▪ ≤ 2 NTU [8] ▪ ≤ 2 mg/l TOC of wastewater origin ▪ Meet drinking water standards after percolation through vadose zone	Includes, but not limited to, the following: ▪ pH ▪ To ▪ Cl ▪ Dri ▪ Oth ▪ TO ▪ Tu ▪ Mo an pre		▪ Depth to groundwater (i.e., thickness to the vadose zone) should be at least 6 feet (2m) at the maximum groundwater hickness of se zone.[12] s or the sum required. d TOC limit.
Groundwater Recharge by Injection into Potable Aquifers	▪ Secondary [4] ▪ Filtration [5] ▪ Disinfection [6] ▪ Advanced wastewater treatment [16]	Includes, but not limited to, the following: ▪ No detectable total coliform/100 ml [9, 10] ▪ 1 mg/l Cl_2 residual (min.) [11] ▪ pH = 6.5 – 8.5 ▪ ≤ 2 NTU [8] ▪ ≤ 2 mg/l TOC of wastewater origin ▪ Meet drinking water standards	Inclu ▪ pH ▪ Tu ▪ To ▪ Cl ▪ TO ▪ Dri ▪ Oth ▪ Mo an pre		s or the sum required. d TOC limit.
Augmentation of Surface Water Supply Reservoirs	▪ Secondary [4] ▪ Filtration [5] ▪ Disinfection [6] ▪ Advanced wastewater treatment [16]	Includes, but not limited to, the following: ▪ No detectable total coliform/100 ml [9, 10] ▪ 1 mg/l Cl_2 residual (min.) [11] ▪ pH = 6.5 – 8.5 ▪ ≤ 2 NTU [8] ▪ ≤ 2 mg/l TOC of wastewater origin ▪ Meet drinking water standards			time and activation. s or the sum required. TOC limit.

Footnotes

(1) These guidelines are based on water reclamation and reuse practices in the U.S., and are specifically directed at states (see Chapter 8). It is explicitly stated that the direct application of these suggested guidelines will not be used by USAID countries

(2) Unless otherwise noted, recommended quality limits apply to the reclaimed water at the point of discharge from the trea

(3) Setback distances are recommended to protect potable water supply sources from contamination and to protect humans

(4) Secondary treatment process include activated sludge processes, trickling filters, rotating biological contractors, and ma

(5) Filtration means; the passing of wastewater through natural undisturbed soils or filter media such as sand and/or anthra

(6) Disinfection means the destruction, inactivation, or removal of pathogenic microorganisms by chemical, physical, or biol

(7) As determined from the 5-day BOD test.

(8) The recommended turbidity should be met prior to disinfection. The average turbidity should be based on a 24-hour time exceed 0.2 NTU and the average SS should not exceed 0.5 mg/l. hould not

(9) Unless otherwise noted, recommended coliform limits are median values determined from the bacteriological results of the last 7 days for which analyses have been completed. Either the membrane filter or fermentation tube technique may be used.

(10) The number of total or fecal coliform organisms (whichever one is recommended for monitoring in the table) should not exceed 14/100 ml in any sample.

(11) This recommendation applies only when chlorine is used as the primary disinfectant. The total chlorine residual should be met after a minimum actual modal contact time of at least 90 minutes unless a lesser contact time has been demonstrated to provide indicator organism and pathogen reduction equivalent to those suggested in these guidelines. In no case should the actual contact time be less than 30 minutes.

(12) It is advisable to fully characterize the microbiological quality of the reclaimed water prior to implementation of a reuse program.

(13) The number of fecal coliform organisms should not exceed 800/100 ml in any sample.

(14) Some stabilization pond systems may be able to meet this coliform limit without disinfection.

(15) Commercially processed food crops are those that, prior to sale to the public or others, have undergone chemical or physical processing sufficient to destroy pathogens.

(16) Advanced wastewater treatment processes include chemical clarification, carbon adsorption, reverse osmosis and other membrane processes, advanced oxidation, air stripping, ultrafiltration, and ion exchange.

(17) Monitoring should include inorganic and organic compounds, or classes of compounds, that are known or suspected to be toxic, carcinogenic, teratogenic, or mutagenic and are not included in the drinking water standards.

(18) See Section 4.4.3.7 for additional precautions that can be taken when a setback distance of 100 ft (30 m) to potable water supply wells in porous media is not feasible.

Example of Suggested Water Reuse Guidelines for Indirect Potable Reuse-Augmentation of Surface Water Supply Reservoirs:

- No detectable total coliform/100 ml
- 1 mg/l Cl2 residual (min.)
- pH = 6.5–8.5
- ≤ 2 NTU
- ≤ 2 mg/l TOC of wastewater origin
- Meet drinking water standards

SO…WHERE DO WE FALL?

Summary of States' Regulations – Table 4-5 (Excerpt Northeast States)

Table 4-5 Summary of State and U.S. Territory water reuse regulations and guidelines*

- ● The intent of the state's regulations or guidelines is oversight of water reuse
- □ The intent of the state's regulations or guidelines is oversight of disposal and water reuse is considered incidental
- -- The state does not have water reuse regulations or guidelines but may permit reuse on a case-by-case basis.

State	Regulations	Guidelines	No Regulations or Guidelines (1)	Change from 2004 Edition	Urban Reuse – Unrestricted	Urban Reuse – Restricted	Agricultural Reuse – Food Crops	Agricultural Reuse – Processed Food Crops and Non-Food Crops	Impoundments – Unrestricted	Impoundments – Restricted	Environmental Reuse	Industrial Reuse	Groundwater Recharge – Nonpotable Reuse	Indirect Potable Reuse
Connecticut			--											
Maine			--											
Massachusetts	●			New (2)	●	●	●	●	●	●	●	●	●	●
New Hampshire			--											
New Jersey	●	●		New (7)	●	●	●	●				●		
New York			--	(9)										
Pennsylvania		●			●	●	●	●	●	●	●	●		●
Rhode Island		●		New (11)	●	●		●				●		
Vermont	●					●		□						

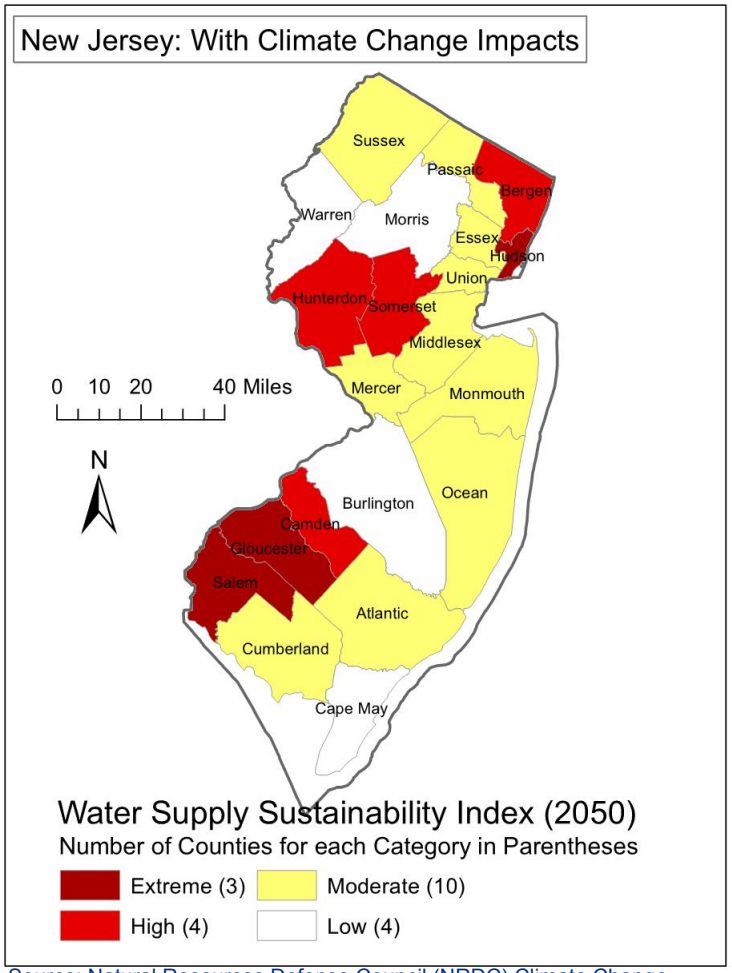
(1) Specific regulations or guidelines on reuse not adopted; however, reuse may be approved on a case-by-case basis
(2) The state had guidelines prior, and now has adopted regulations.
(7) The state had guidelines prior, and now has adopted reuse regulations as well as guidelines.
(9) Current interpretation is that New York has no regulations or guidelines.
(11) The state previously had no guidelines or regulations and has adopted guidelines.

New Jersey Water Reuse Public Service Announcement?

- Play Video

New Jersey's State of State's Water Reuse

- New Jersey is considered a "Water Rich" state
- New Jersey also has the highest population density in the US
- Coupling population growth and climate change, New Jersey is at high risk for water shortage
- Reclaimed Water for Beneficial Reuse (RWBR) program began in 1999 in response to significant impacts due to the 1999 drought



Source: Natural Resources Defense Council (NRDC) Climate Change, Water, and Risk: Current Water Demands Are Not Sustainable

“Reclaimed Water for Beneficial Reuse” Technical Manual

- In 2005, NJDEP Issued the “Reclaimed Water for Beneficial Reuse” Technical Manual
  - Developed to assist wastewater systems in implementing a Reclaimed Water for Beneficial Reuse (RWBR) program
  - Includes design, operation, and maintenance criteria for wastewater systems discharging reclaimed water

“Reclaimed Water for Beneficial Reuse” Technical Manual

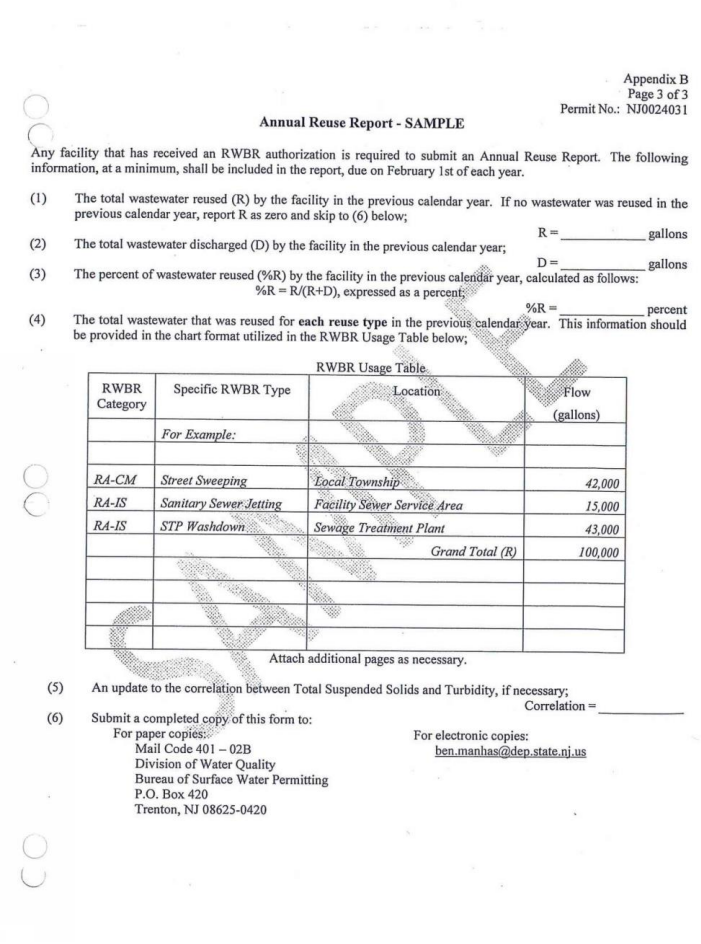
- Divided into Four Categories:
  - Type I – Public Access Systems
  - Type II – Restricted Access/ Non-Edible Crop Systems
  - Type III – Agricultural Edible Crop Systems
  - Type IV – Industrial Systems, Maintenance Operations and Construction

New Jersey's RWBR Program Objective

- "To help preserve the highest quality water and reduce the export of freshwater out of basins in support of meeting water supply needs and natural resource protection."
- Reclaimed Water Regulations Adopted in January 2009 (NJPDES Rules N.J.A.C. 7:14A-2.15)
- Reclaimed Water Regulations in turn reference the "Technical Manual for Reclaimed Water for Beneficial Reuse," dated January 2005

New Jersey's RWBR Program

- Currently, there are over 125 NJPDES/DSW Permits with RWBR Languages in Part IV
- Once approved for RWBR, Permittee Required to file an Annual Reuse Report with NJDEP
- For 2014, 37 Facilities Reported Reclaimed Water Use



Appendix B
Page 3 of 3
Permit No.: NJ0024031

Annual Reuse Report - SAMPLE

Any facility that has received an RWBR authorization is required to submit an Annual Reuse Report. The following information, at a minimum, shall be included in the report, due on February 1st of each year.

(1) The total wastewater reused (R) by the facility in the previous calendar year. If no wastewater was reused in the previous calendar year, report R as zero and skip to (6) below;
R = _____ gallons

(2) The total wastewater discharged (D) by the facility in the previous calendar year;
D = _____ gallons

(3) The percent of wastewater reused (%R) by the facility in the previous calendar year, calculated as follows: %R = R/(R+D), expressed as a percent;
%R = _____ percent

(4) The total wastewater that was reused for **each reuse type** in the previous calendar year. This information should be provided in the chart format utilized in the RWBR Usage Table below;

RWBR Usage Table

RWBR Category	Specific RWBR Type	Location	Flow (gallons)
	For Example:		
RA-CM	*Street Sweeping*	*Local Township*	*42,000*
RA-IS	*Sanitary Sewer Jetting*	*Facility Sewer Service Area*	*15,000*
RA-IS	*STP Washdown*	*Sewage Treatment Plant*	*43,000*
		Grand Total (R)	*100,000*

Attach additional pages as necessary.

(5) An update to the correlation between Total Suspended Solids and Turbidity, if necessary;
Correlation = _____

(6) Submit a completed copy of this form to:
For paper copies:
Mail Code 401 – 02B
Division of Water Quality
Bureau of Surface Water Permitting
P.O. Box 420
Trenton, NJ 08625-0420

For electronic copies:
ben.manhas@dep.state.nj.us

SAMPLE

New Jersey's RWBR Program – 2014 Report

Calendar Year 2014

Facility	NJPDES No. NJ0	Spr Irrigation (Golf Course)	Spr Irrigation (Public Grounds)	Spr Irrigation (Residental Lawn)	Vehicle Washing	Hydro-seeding/ Fertilizing	Decorative Fountains	Sod Irrigation	Spr Irrigation (within fence)	Spr Irrig. (within fence) w/o NH3-NO3	Spr Irrigation (not fenced)	Street Sweeping	Dust Control	Fire Protection	Vehicle Washing (at STP or DPW)	Composting	Sanitary Sewer Jetting	Non-Contact Cooling Water (NCCW)	Boiler Makeup Water	Road Milling	Hydrostatic Testing	Parts Washing (or Process Water)	Plant Wash Down (& Pump Seal)	Totals
		PUBLIC ACCESS						RESTRICTED ACCESS																	
Bristol-Myers	000795																	1,282,624						1,282,624
Kraft Foods	002577																	6,633,000						6,633,000
PolyOne	004286													133,585			100,000					55,150,000	100,000	55,483,585
Valero (Paulsboro Ref.)	005029													16,550,000				58,600,000			7,120,000	13,780,000		96,050,000
BCUA - Little Ferry	020028																	1,258,619,000					269,000,000	1,527,619,000
Cape May WTF	020371																						52,000	52,000
Town of Cli																								
Caldwell W																								
Harrison Te																								
BCUA - Ed																								
Skillman Vi																								
Pottersville																								
Delran Tws																								
Willingboro																								
Western Mo																								
Evesham - I																								
Princeton M																								
ACUA																								
Rahway Va																								
City of Burl																								
Gloucester C																								
Joint Meeti																								
Hanover SA																								
Linden Ros																								
Mount Laur																								
Town of Mo																								
OCUA-Sout																								
Logan Twsp																								
OCUA-NW																								
OCUA-Cen																								
Millville																								
Exxon-Mobi																		1,008,318				663,054		1,671,372
CMCMUA	052990		2,739,030																				10,207,879	12,946,909
Pike Brook STP	060038																						9,197,760	9,197,760
Homestead WTP	098663			11,504,245																				11,504,245
MCUA	165832																	2,500,000,000				1,000,000,000		3,500,000,000
PVSC	165883																	49,000						49,000
																								0
		59,606,200	2,739,030	11,504,245	0	0	0	0	0	1,404,000	0	0	8,000	16,683,585	13,700	0	362,582	6,118,793,207	0	7,805	7,120,000	1,075,993,054	2,528,966,566	9,823,201,974
Percent		0.61	0.03	0.12	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.17	0.00	0.00	0.00	62.29	0.00	0.00	0.07	10.95	25.74	100.00

	(Gallons)	%
RA (not NCCW)	3,630,559,292	36.96%
RA (NCCW)	6,118,793,207	62.29%
PA	73,849,475	0.75%

Abbreviations

RA - Restricted Access
PA - Public Access
NCCW - Non Contact Cooling Water
STP - Sewage Treatment Plant
DPW - Department of Public Works

2014 Total Reclaimed Water Reportedly Reused: 9.83 BG

Type I – Public Access Systems: 73.8 MG

Type II – Restricted Access/Non-Edible Crop Systems: 4.4 MG

Type IV - Industrial/Maintenance/Construction: 9.75 BG

- Non-Contact Colling Water: 6.11 BG
- Plant Wash Down Water (As Reported to DEP): 2.53 BG

EPA Guidelines For Water Reuse 2012

Case Study Example – Golf Course Irrigation

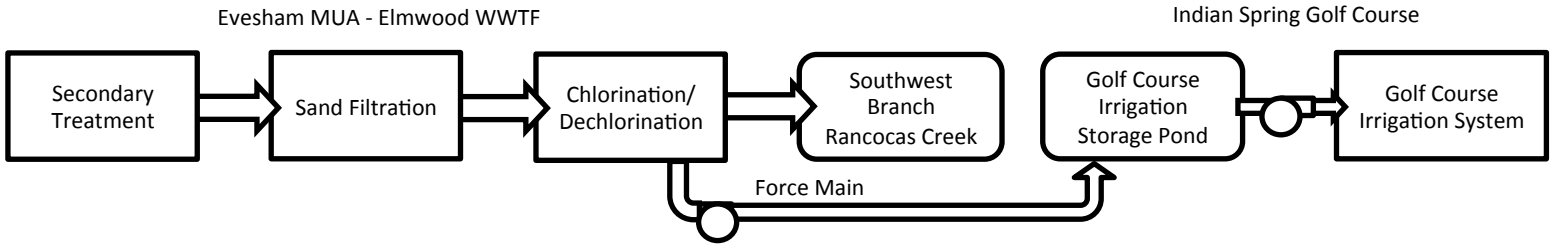
Evesham MUA-Elmwood WWTF/Indian Spring Golf Course

- Evesham MUA-Elmwood WWTF effluent used as the source of irrigation water at the Indian Springs Golf Course
- Indian Springs Golf Course owned and operated by Evesham Township located in Marlton, NJ and in NJDEP Critical Areas #2

Case Study Example – Golf Course Irrigation

Evesham MUA-Elmwood WWTF/Indian Spring Golf Course

- Evesham MUA-Elmwood WWTF secondary effluent followed sand filtration and chlorination/dechlorination
- Reclaimed water is pumped to Indian Spring via a 0.5 mile force main to a lined irrigation storage pond
- All capital and operating expenses for pumping and force main paid by Evesham MUA
- In 2014, Elmwood WWTF sends Indian Springs 16.5 MG of reclaimed water during the golf season.



Case Study Example – Golf Course Irrigation

Evesham MUA-Elmwood WWTF/Indian Spring Golf Course

- NJPDES Additional Permit Limits for Evesham-Elmwood WWTF Reclaimed Water:

Parameter	**Evesham MUA-Elmwood WWTF**
TSS	5.0 mg/l (Instantaneous Max)
Turbidity	2 NTU
Fecal Coliform	2.2/100ml (7 day median) 14/100ml (Instantaneous Max)
Residual Chlorine	1.0 mg/l (minimum)

Case Study Example – Golf Course Irrigation

Evesham MUA-Elmwood WWTF/Indian Spring Golf Course

- Reclaimed Water Discharge Permit Limits Comparison

Reclaimed Water Characteristics	2012 EPA Water Reuse Guideline for Urban Reuse – Unrestricted	Yarmouth-Dennis STP Irrigation Storage Tank (MA)	Evesham-Elmwood WWTF (NJ)
pH (1)	6-8	6.5-8.5	4.5-9
BOD5 (1)	≤ 10 mg/l	30 mg/l	10 mg/l (Monthly Ave) 15 mg/l (Weekly Ave)
TSS	-	-	5 mg/l (Instantaneous Max)
Turbidity	≤ 2 NTU	2 NTU	2 NTU
Fecal Coliform	No detectable colonies/ 100ml	NA/100ml (7-day median value) 14 /100ml (Instantaneous Max)	2.2/100ml (weekly median) 14/100ml (Instantaneous Max)
Residual Chlorine	1.0 mg/l (min)	NA (2)	1.0 mg/l (minimum)
Total Nitrogen (N02 + N03 + TKN)	-	14 mg/l (Annual Average) 30 mg/l (Instantaneous Max)	-

Note: (1) Standard Plant Effluent Monitoring
(2) Chlorination not allowed on Cape Cod

Case Study Example – Power Plant Cooling

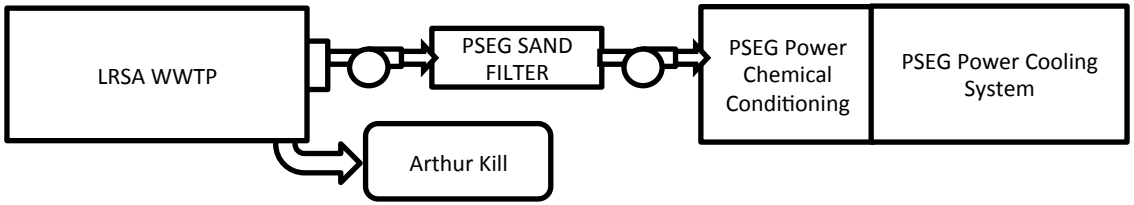
Linden Roselle Sewerage Authority (LRSA)/PSEG Power

- PSEG Power is 1,300 MW natural gas combined-cycle power plant in Linden, NJ
- LRSA wastewater effluent used by power plant for cooling water supply source

Case Study Example – Power Plant Cooling

Linden Roselle Sewerage Authority (LRSA)/PSEG Power

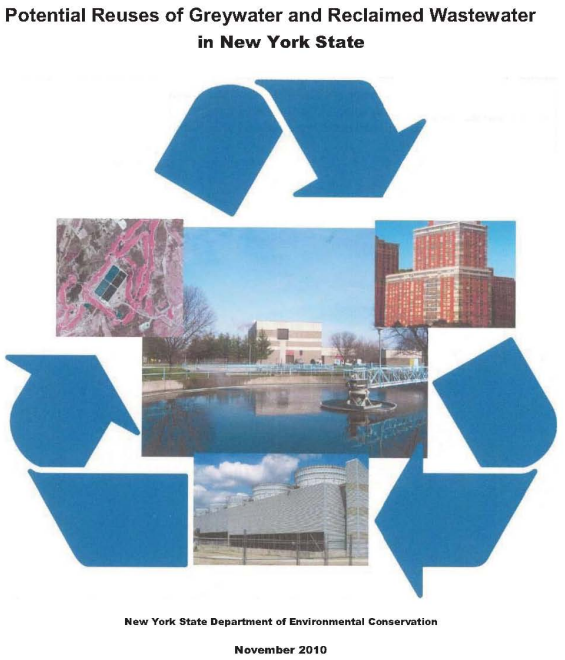
- LRSA WWTF uses activated sludge for secondary treatment along with UV Disinfection
- PSEG Power constructed shallow bed sand filters on leased LRSA property to provide additional filtration
- Minor chemical treatment at PSEG Power
- Capital Cost of Project approx. $15M
- In 2014, 1.2 BG of Reclaimed Water Supplied to PSEG Power
- Source of revenue for LRSA (approx. $200k-$350k)



WHAT ABOUT NEW YORK??

New York's State of State's Water Reuse

- In 2010, NYSDEC Completed "Potential Reuse of Greywater and Reclaimed Wastewater in New York State" Report
  - Summary of other states water reuse programs including 2004 EPA *Guidelines for Water Reuse*
  - Summary existing NYS water reuse projects
  - Provides regulatory recommendations



Potential for Reuse in New York State?

- New York State is considered "Water Rich"
- Population growth and density in some areas are beginning stress local water systems
- Potable water from reclaimed water not recommended by NYSDEC and NYSDOH

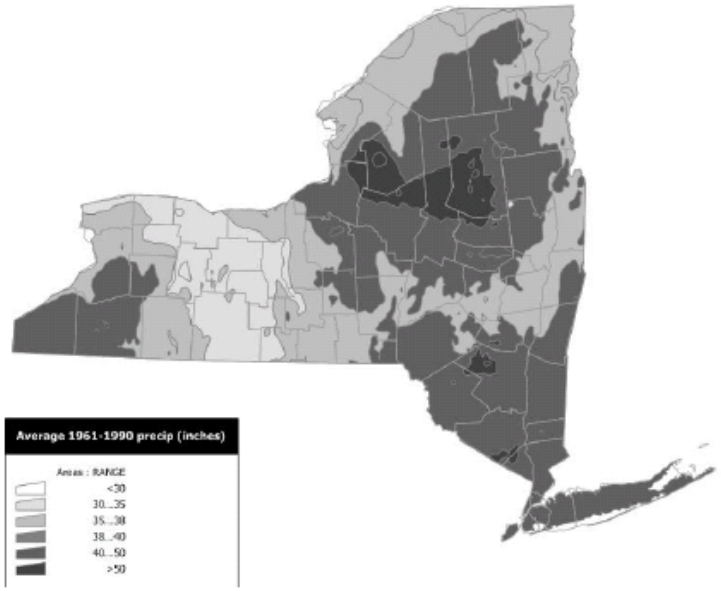


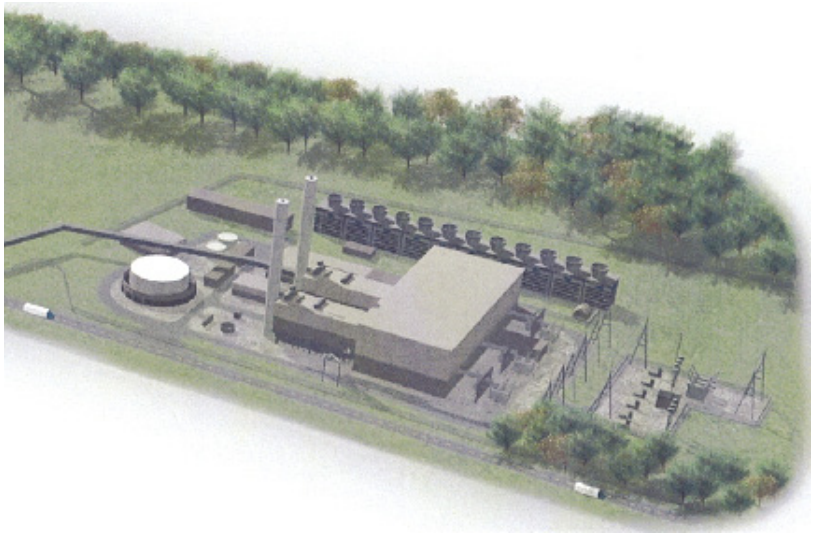
Figure 1: Spatial Patterns of New York State Precipitation

Drivers for Water Reuse in New York State

- Lack or limited availability of water supply
- Nutrient load reduction
- Building LEED certification
- Green philosophy

Current Water Reuse Types and Projects in New York State

- Golf course irrigation
  - Lack or limited water availability
  - Nutrient reduction
- Power plant cooling tower water
- In-building reuse



So…What's the Next Step for New York

- In the NYSDEC 2010 Water Reuse Report, "DEC recommends the development of a guidance document to provide technical criteria to interested parties rather than development of regulations and criteria for wastewater reuse."

Presentation Take Away

- EPA Water Reuse Guidelines = Great Technical and Practical Reference
- Water Reuse Will Expand in New Jersey and New York
- Portable Reuse is Coming!!!

Questions

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NEW YORK REUSE EXAMPLES

Case Study Example – Power Plant Cooling

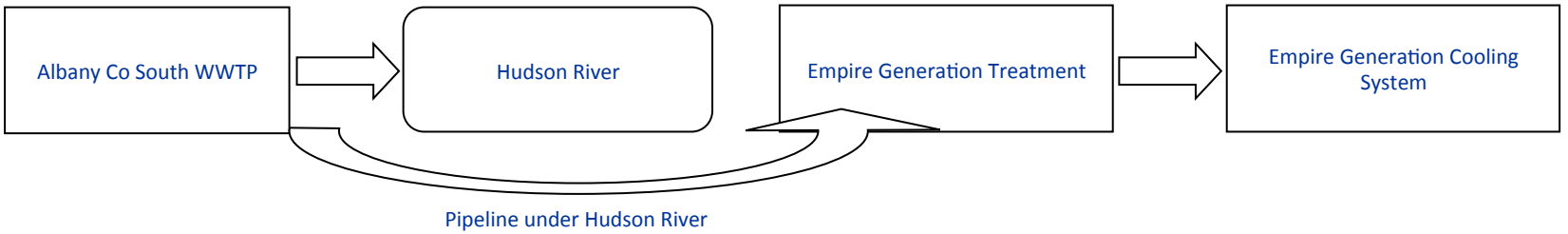
Albany Co South WWTP/Empire Generating Co

- Empire Generating Company LLC is 635 MW natural gas fired power generation plant in Rensselaer, NY
- Albany Co South WWTP effluent used by power plant for cooling water supply source
- Final effluent diverted into 0.5 mile pipeline under Hudson River
- Up to 3.1 MGD (Annual Average)
- Source of revenue for Albany Co Sewer District

Case Study Example – Power Plant Cooling

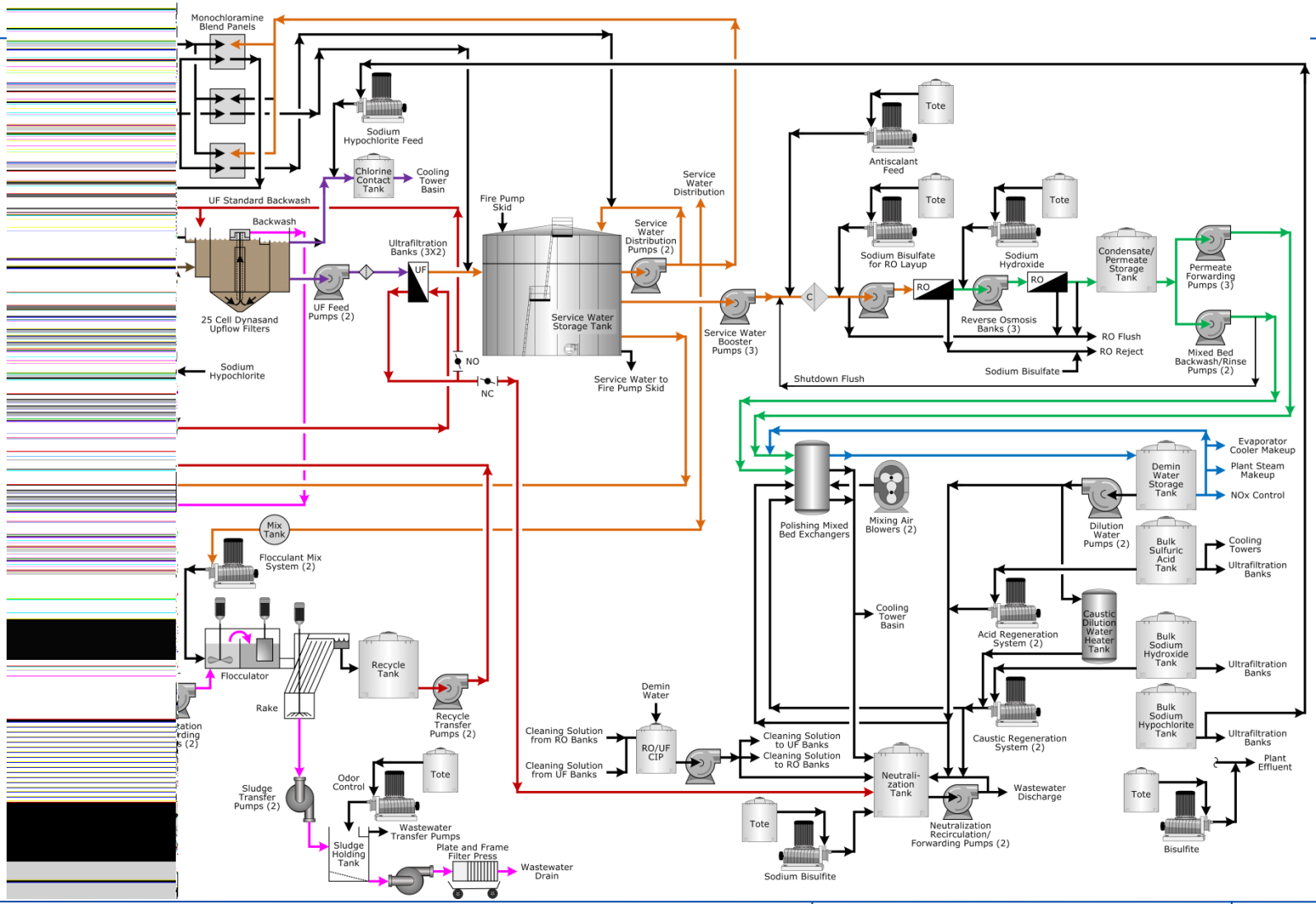
Albany Co South WWTP/Empire Generating Co

- Albany Co South WWTP uses activated sludge for secondary treatment
- No process modifications required at Albany Co South WWTP
- No effluent monitoring or report changes required
- Additional treatment required at Empire Generating



Case Study Example – Power Plant Cooling

Albany Co South WWTP/Empire Generating Co



Case Study Example – Golf Course Irrigation

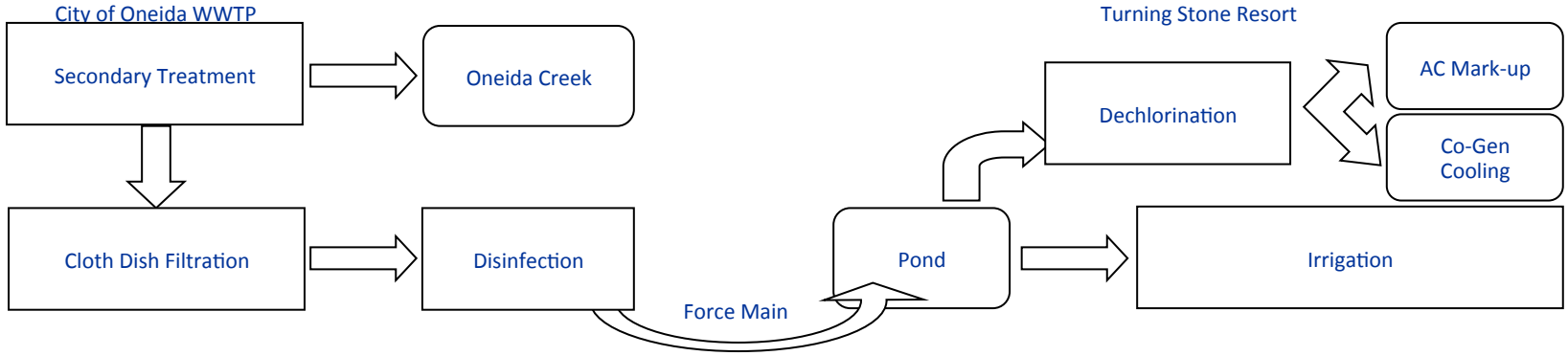
City of Oneida WWTP/Turning Stone Resort

- Turning Stone Resort and Casino owned and operated by Oneida Nation located near Verona, NY
- City of Oneida WWTP effluent used as the source of irrigation water at three golf courses plus building system water
- City of Oneida WWTP sends Turning Stone 1.1 MGD during the golf season and approximately 0.5 MGD during winter

Case Study Example – Golf Course Irrigation

City of Oneida WWTP/Turning Stone Resort

- City of Oneida's WWTP secondary effluent for Turning Stone undergoes further treatment before being pumped to Turning Stone via a 4 mile force main
- All capital and operating expenses filtration and disinfection, force main and pumping plus a share of the WWTP admin cost is paid by Oneida Nation



Case Study Example – Golf Course Irrigation

City of Oneida WWTP/Turning Stone Resort

- SPDES Permit Limits for City of Oneida WWTP:

Parameter	**City of Oneida WWTP at Force Main Entrance**
Nitrate-N	20 mg/l (daily max)
Total Coliform	5,000/100ml (maximum) 2,400/100ml (daily ave)
Fecal Coliform	400/100ml (7-day geo mean) 200/100ml (30-day geo mean)
Residual Chlorine	0.5-2.0 mg/l

Case Study Example – Golf Course Irrigation

City of Oneida WWTP/Turning Stone Resort

- SPDES Permit Limits Comparison

Effluent Characteristics	2012 EPA Water Reuse Guideline for Urban Reuse – Unrestricted	Yarmouth-Dennis STP Irrigation Storage Tank (MA)	City of Oneida WWTP at Force Main Entrance (NY)
pH	6-8	6.5-8.5	-
BOD5	≤ 10 mg/l	30 mg/l	-
Turbidity	≤ 2 NTU	2 NTU	-
Fecal Coliform	No detectable colonies/ 100ml	No detectable colonies/100ml (median value) and not to exceed 14 colonies/100ml in any single sample	400/100ml (7-day geo mean) 200/100ml (30-day geo mean)
Total Coliform	-	-	5,000/100ml (maximum) 2,400/100ml (daily ave)
Residual Chlorine	1.0 mg/l (min)	NA (Chlorination not allowed on Cape Cod)	0.5-2.0 mg/l
Total Nitrogen (N02 + N03 + TKN)	-	14 mg/l annual average, not to exceed 30 mg/ l in anyone sampling period	-
Nitrate-N	-	-	20 mg/l (daily max)