



Department of the Environment

Maryland Water Reuse Regulations

by

Ching-Tzone Tien, Ph.D., P.E., Chief
Groundwater Discharge Permit Division
Water Management Administration
Maryland Department of the Environment

September 29, 2010
19th Maryland Ground Water Symposium



Outline

- Introduction
- Status of Water Reuse in Maryland
 1. Existing Water Reuse Regulations/ Guidelines
 2. Current Water Reuse in Maryland
- Proposed Water Reuse Regulations in Maryland





What is Water Reuse ?

- Water recycling is reusing treated wastewater for **beneficial purposes** such as agricultural and landscape irrigation, industrial processes, toilet flushing, and replenishing a ground water basin (referred to as ground water recharge) - **USEPA Region 9 Water Program**
- Recycled or reclaimed water is water that is used **more than one time** before it passes back into the natural water cycle. – **Water Reuse Association**



Schematic of Water Reuse



Courtesy of European Union - ENV: Treated water used to restore marshlands or lagoons. The water is treated by natural agents. // IRR: Irrigation // URB/DOM: Water for urban and domestic use // POT: Treatment plant // IND: Industrial use // RAS: Restoring ground water // (Source: Veolia)





Water Reuse Rate in Top Four States of USA

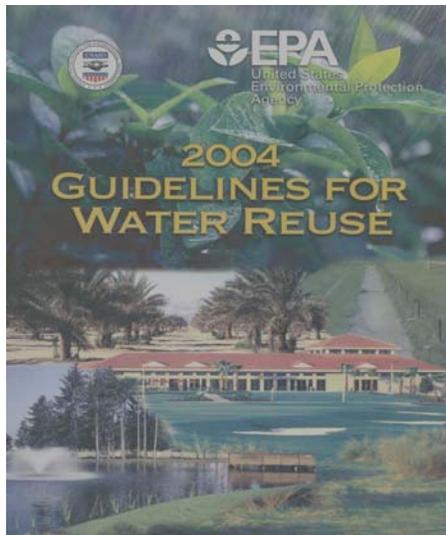
State	Water Reuse Rate* (Million gallons per day, mgd)
Florida	584
California	525
Texas	230
Arizona	220

*Water reuse rate in 2002

Source: 2004 US EPA Guidelines for Water Reuse



US EPA Water Reuse Guidelines



“ This document is intended to be solely informational and does not impose legally-binding requirements on EPA, States, local or tribal governments, or members of the public” (page 1 of the Guidelines)

Web site for the 2004 Guidelines:
<http://www.epa.gov/ord/NRMRL/pubs/625r04108/625r04108.pdf>





US EPA Water Reuse Guidelines

1. Provide technical and policy guidance as well as case studies for: (1) Urban reuse; (2) Industrial reuse; (3) Agricultural reuse; (4) Environmental & recreational reuse and (5) Groundwater recharge.
2. Summarize existing water reuse regulations and guidelines in States of USA. This is useful to States in developing new water reuse standards, and revising or expanding existing regulations.
3. Include examples of water reuse programs outside the US.
4. Discuss legal and institutional issues including water rights, water supply regulations, Safe Drinking Water Act and legal issues in implementation.

The document is useful to planners, consulting engineers and others actively involved in the evaluation, planning, design, operation or maintenance of water reclamation and reuse facilities.



Existing Water Reuse Regulations/ Guidelines in Maryland

Existing regulations focus on water reuse through land application of treated wastewaters

[Annotated Code of Maryland, § 9-303.1 - Use of reclaimed water](#)

The Department shall encourage the use of reclaimed water as an alternative to discharging wastewater effluent into the surface waters of the State.

Reclaimed water may be used for irrigation of: (1) Farmland; (2) Golf courses; (3) Athletic fields; (4) Turf; (5) Landscaping; and (6) Any other use that the Department considers appropriate.

[Codes of Maryland Regulations \(COMAR\) 26.08.02.09.D.\(1\) – Guidelines for Discharge to Groundwaters](#)

Land disposal of municipal wastewater or wastewater with similar characteristics shall follow the Department of the Environment's "Guidelines for Land Application/Reuse of Treated Municipal Wastewaters" MDE-WMA-001-04/10, which is incorporated by reference.*

*The latest amendment to include reuse of Class III effluent was published in Maryland Register on 4/14/2010 and became effective on 5/3/2010





Maryland Land Application/Reuse Guidelines

AMENDED: 04/2010

MARYLAND DEPARTMENT OF THE ENVIRONMENT
GUIDELINES
FOR
LAND APPLICATION / REUSE
OF
TREATED MUNICIPAL WASTEWATERS

MDE-WMA-001-04/10

Web site for MDE guidelines:
[http://www.mde.state.md.us/assets/document/MDE-WMA-001%20\(Land-Treatment%20Guidelines\).pdf](http://www.mde.state.md.us/assets/document/MDE-WMA-001%20(Land-Treatment%20Guidelines).pdf)



Water Reuse Guidelines

(Prior to 5/3/2010)

The guidelines regulate the land application of treated wastewater via three alternatives in recharging groundwater and meeting vegetation consumptive demand. Listed below are respective effluent quality requirements :

Parameter	Slow Rate (spray irrigation/drip irrigation)		Overland Flow	Rapid Infiltration
	Class I*	Class II**		
Biochemical Oxygen Demand (5 day)	70 mg/l	10 mg/l	70 mg/l	Case by case
Suspended Solids	90 mg/l	10 mg/l	90 mg/l	Case by case
Fecal Coliform ^b (MPN per 100 mL)	200 3 (golf courses)	3	200	Case by case
pH	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5

*Class I effluent can be achieved by lagoon treatment but is required with a wider buffer area: 200 feet to property lines, waterways, roads, etc. For residential properties, parks, and other areas where people congregate, a 500-foot buffer homes. 50% buffer reduction in wooded areas

** Class II effluent meets reclaimed water quality defined in Annotated Code § 9-303.1: The buffer zone widths shall be 25 feet from property lines, housing structures, public roads and streams, 50 feet from schools and playgrounds, 100 feet to potable wells and water intake





Proposed Water Reuse Guidelines

Phase I - Class III effluent*

- irrigation on non-restricted public access areas
- parks, playgrounds, school yards, cemeteries
- highway landscapings and other green open spaces

*Amend the existing MDE Land Treatment Guidelines to include reuse of Class III effluent. The guidelines are incorporated by reference in existing COMAR 26.08.02.09. D. and are a part of COMAR



Proposed Water Reuse Regulation

Phase II - Class IV effluent *

- **Commercial**
 - laundries, car wash, snow making, air conditioning, closed loop cooling, window washing and pressure cleaning
- **Non-food crops and food crops (no contact with edible portion of the unprocessed crops)**
- **Industrial**
 - washing aggregates, concrete, cooling water, parts washing, equipment operations, and other manufacturing processes

*Create a new chapter in COMAR for water reuse





Milestones for Phase 1 Amendment

- May 1, 2009 - Review Phase I amendment by the State Water Reuse Committee completed
- May 15, 2009 - Submit to stakeholders for informal review
- June 15, 2009 - Informal stakeholder comments due
- July 1, 2009 – Submit final draft to Attorney General Office for review
- August 14, 2009 - Submit to MDE Senior staff for review
- January 29, 2010 - Published in the MD Register
- March 1, 2010 - Public comment period ends
- April 14, 2010 - Submit Final Regulation to Maryland Register
- April 23, 2010 - Notice of Final Action published
- May 3, 2010 - Final Action becomes effective



Newly Amended Class III Effluent Quality (effective on 5/3/2010)

Parameter	Slow Rate			Overland Flow	Rapid Infiltration
	Class I	Class II	Class III		
Biochemical Oxygen Demand (5 day) (monthly average)	70 mg/l	10 mg/l	10 mg/l	70 mg/l	Case by case
Suspended Solids (monthly average) or Turbidity (NTU) (continuous monitoring)	90 mg/l	10 mg/l	2 NTU (daily average) Not to exceed 5 NTU at any time	90 mg/l	Case by case
Fecal Coliform ^b (MPN per 100 mL) (monthly geometric mean)	200 3 (golf course)	3	2.2	200	Case by case
pH	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5





Comparisons of Water Quality Requirements for Unrestricted Urban Reuse in 8 States

Unrestricted Urban Reuse

	Arizona	California	Florida	Hawaii	Nevada	Texas	Washington	Maryland
Treatment	Secondary treatment, filtration, and disinfection	Oxidized, coagulated, filtered, and disinfected	Secondary treatment, filtration, and high-level disinfection	Oxidized, filtered, and disinfected	Secondary treatment and disinfection	NS ⁽¹⁾	Oxidized, coagulated, filtered, and disinfected	NS
BOD₅	NS	NS	20 mg/l CBOD ₅	NS	30 mg/l	5 mg/l	30 mg/l	10 mg/l
TSS	NS	NS	5.0 mg/l	NS	NS	NS	30 mg/l	NS
Turbidity	2 NTU (Avg)	2 NTU (Avg)	NS	2 NTU (Max)	NS	3 NTU	2 NTU (Avg)	2 NTU (avg)
	5 NTU (Max)	5 NTU (Max)					5 NTU (Max)	5 NTU (max)
Coliform	Fecal	Total	Fecal	Fecal	Fecal	Fecal	Total	Fecal
	None detectable (Avg)	2.2/100 ml (Avg)	75% of samples below detection	2.2/100 ml (Avg)	2.2/100 ml (Avg)	20/100 ml (Avg)	2.2/100 ml (Avg)	2.2/100 ml (avg)
	23/100 ml (Max)	23/100 ml (Max in 30 days)	25/100 ml (Max)	23/100 ml (Max in 30 days)	23/100 ml (Max)	75/100 ml (Max)	23/100 ml (Max)	NS

⁽¹⁾ NS - Not specified by state regulations

Source: 2004 US EPA Guidelines for Water Reuse



Other Limitations for Use of Class III Effluent

1. A minimum buffer zone of 100 feet to:
 - (1) potable wells and water intakes and
 - (2) outdoor licensed public eating, drinking and bathing facilities.

2. Irrigation of Class III effluent on fruit and vegetable not commercially processed, including crops eaten raw, is prohibited.





Other Limitations for Use of Class III Effluent

3. Irrigation of Class III effluent on bare soil is prohibited except for seeding area. Irrigation on high water table or saturated soils which cause persistent surface runoff and ponding is prohibited.
4. A "Reclaimed Water, Do Not Drink" sign shall be posted in the irrigation area to inform the public about irrigation of treated wastewater.



Current Water Reuse in Maryland

- 35 spray irrigation systems in operation including 9 golf courses. Total designed flow (Q) : 5.4 mgd
- 4 rapid infiltration (RI) systems in operation (3 in St. Mary's County and 1 in Calvert County), Q= 1 mgd
- 2 overland flow systems in operation (Easton and Emmitsburg), Q=4.3 mgd
- 3 drip irrigation systems in operation (Marley Run, Calvert Gateway and Eagle nest), Q=0.11mgd



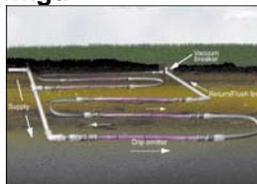
Ridgely spray field



Golf Course irrigation



Solomons Island RI Basins



Schematic of Drip irrigation





Proposed Class IV Effluent Quality

Parameter	Slow Rate Irrigation For Restricted Public Access		Slow Rate Irrigation for Urban Reuse-Unrestricted Public Access	Water Reuse for All Purposes
	Class I	Class II	Class III	Class IV
Biochemical Oxygen Demand (5 day) (monthly average)	70 mg/l	10 mg/l	10 mg/l	10 mg/l
Suspended Solids (monthly average for Classes I & II) or Turbidity (NTU)	90 mg/l	10 mg/l	2 NTU (daily average) Not to exceed 5 NTU at any time	2 NTU (daily average) Not to exceed 5 NTU at any time
E. coli (MPN per 100 mL) (monthly geometric mean) Or meet the Fecal Coliform limit below	126 1.1 for golf course irrigation	1.1	1.1	1.1
Fecal Coliform (MPN per 100 mL) (monthly geometric mean)	200 3 (golf course)	3	2.2	2.2
pH	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5	6.5 - 8.5
Total Nitrogen (monthly average)	Case by case	Case by case	Case by case	10 mg/l
Total residual chlorine at outlet (any time)	Case by case	Case by case	Case by case	0.5-4 mg/l



Other Proposed Limitations for Use of Class IV Effluent

1. A water reuse permit must be obtained from the Department prior to reuse.
2. Reuse of Class IV effluent shall not cause nuisance or adverse environmental/public health impacts.
3. All force mains for transmitting Class IV effluent must be purple color and provide adequate separation from water mains in accordance with applicable State and local regulations.
4. All indoor Class IV effluent pipes must be purple in color and installed in accordance with applicable plumbing codes.
5. Commercial building means any non-residential building or residential apartments or condominiums consisting of at least 10 units and managed by a property management company or other similar corporate entity acceptable to the Department.





Proposed Gray Water Reuse Regulation

- Recycle/reuse of graywater inside a building shall conform to the National Standard Plumbing Code which was incorporated by reference by the Maryland State Plumbing Code (COMAR 09.20.01.01) or local plumbing code adopted by authority has jurisdiction.
- Irrigation of graywater via land treatment methods shall conform to “Maryland Department of the Environment Guidelines for Land Application/Reuse of Treated Municipal Wastewaters”
- For subsurface irrigation of graywater, not considered land application, an on-site sewage disposal permit is required



National Standard Plumbing Code (2009)

Appendix G Graywater Recycling Systems

- **Section G-4 Approved Installations**
 - a. Prior to construction of a graywater system, the appropriate permits shall be obtained from the Authority Having Jurisdiction. The applicant shall provide the Authority Having Jurisdiction with complete plans and manufacturers' recommendations of the proposed installation.
 - b. All pipe sizing and installation procedures shall conform to the applicable sections of this Code.
- **Proposed National Code Change of 12/17/2009**
 1. Graywater in single dwelling units shall be limited to subsurface landscaping irrigation in accordance with the requirements of Authority Having Jurisdiction
 2. Graywater in other than single dwelling units that is filtered and disinfected shall be permitted used for flushing water closets and urinals in accordance with the requirements of the Authority Having Jurisdiction.
 3. Harvested rainwater in other than single dwelling units that is filtered shall be permitted to be used for flushing water closets and urinals and subsurface landscape irrigation in accordance with the requirements of the Authority Having Jurisdiction.





Status of Phase II Amendment

- Currently under review by the State Water Reuse Committee
- The draft Maryland water reuse regulation is expected to be completed in June of 2011.
- May require change of State Plumbing Code



Thank You!
&
Questions (?)

