



## **Economic Impact Analysis Virginia Department of Planning and Budget**

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### **9 VAC 25-740 – Water Reclamation and Reuse Regulation Department of Environmental Quality April 26, 2007**

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#### **Summary of the Proposed Regulation**

The State Water Control Board (Board) proposes to promulgate the Water Reclamation and Reuse Regulation to promote and encourage the reclamation and reuse of wastewater in a manner that is protective of the environment and public health. The regulation will establish permitting requirements, general requirements for design, operation and maintenance, quality standards, monitoring requirements, and approved reuses for reclaimed water.

The requirements of the proposed regulation shall apply to all new wastewater reclamation systems, reclaimed water distribution systems and, as applicable, water reuses for which Virginia Pollution Abatement (VPA) or Virginia Pollutant Discharge Elimination System (VPDES) permit<sup>1</sup> applications are received after the effective date of this regulation. Existing permitted facilities producing, distributing or using reclaimed water would not be required to comply with this regulation unless such facilities are modified or expanded.

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<sup>1</sup> “Virginia Pollution Abatement (VPA) Permit” means a document issued by the Board, pursuant to the Virginia Pollution Abatement Permit Regulation (9 VAC 25-32-10 et seq.), authorizing pollutant management activities under prescribed conditions. “Virginia Pollutant Discharge Elimination System (VPDES) Permit” means a document issued by the Board, pursuant to the Virginia Pollutant Discharge Elimination System Permit Regulation (9 VAC 25-31-10 et seq.), authorizing, under prescribed conditions the potential or actual discharge of pollutants from a point source to surface waters and the use or disposal of sewage sludge. Under the approved state program, a VPDES permit is equivalent to an NPDES permit.

## Results of Analysis

The benefits likely exceed the costs for one or more proposed changes. There is insufficient data to accurately compare the magnitude of the benefits versus the costs for other changes.

## Estimated Economic Impact

Currently, some of the facilities in the Commonwealth are allowed under their VPA permits or VPDES permits to produce and distribute reclaimed water<sup>2</sup>. Any treatment works treating domestic, municipal or industrial wastewater that produces reclaimed water or a facility that distributes reclaimed water is required to obtain either a VPA permit if a discharge to surface waters is not involved, or a VPDES permit if a discharge to surface waters is involved. Except for some irrigation projects, end users of reclaimed water are not required to get a permit and have been regulated indirectly through the producers' or suppliers' VPA or VPDES permit.

As required by the Code of Virginia, the Board proposes to adopt the Water Reclamation and Reuse Regulation to promote and encourage the reclamation and reuse of wastewater that are protective of public health and the environment as an alternative to directly discharging pollutants into state waters. The regulation will establish permitting requirements, general requirements for design, operation and maintenance, quality standards, monitoring requirements, and approved reuses for reclaimed water.

The proposed regulation recognizes that different uses of water can tolerate different levels of water quality depending on the potential health and environmental risks. It establishes technical requirements for reclamation and treatment standards for reclaimed water relative to the potential for discharge to the environment and for human contact by specific reuse categories. When properly regulated, the use of reclaimed water treated to Level 1 and Level 2 standards<sup>3</sup> for purposes that are commensurate with the risk associated with its uses will likely increase the amount of potable water available for other necessary uses and will lead to a more

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<sup>2</sup> "Reclaimed water" means water resulting from the treatment of domestic, municipal or industrial wastewater that is suitable for a water reuse that would not otherwise occur. Specifically excluded from this definition is "gray water".

<sup>3</sup> According to the proposed regulation, "Level 1" means a degree of treatment at which reclaimed water has received, at a minimum, secondary treatment with filtration and higher-level disinfection, and meets all other applicable standards specified in 9 VAC 25-740-70. "Level 2" means a degree of treatment at which reclaimed

efficient allocation of the existing water resources, without creating hazards to public health or the environment.

According to the proposed regulation, reclaimed water treated to Level 1 standard may be used for the following categories: 1) urban - unrestricted access<sup>4</sup>: including all types of landscape irrigation in public access areas (i.e., golf courses, cemeteries, public parks, school yards and athletic fields), toilet flushing – non-residential, fire fighting or protection and fire suppression in non-residential buildings, outdoor domestic or residential reuse (i.e., lawn watering and non-commercial car washing), commercial car washes, and commercial air conditioning systems, 2) irrigation – unrestricted access: irrigation for any food crops not commercially processed, including crops eaten raw, 3) landscape impoundments with potential for public access or contact, and 4) commercial laundries.

Reclaimed water treated to Level 2 standard may be used for the following purposes: 1) irrigation – restricted access<sup>5</sup>: irrigation for any food crops commercially processed, irrigation for non-food crops and turf, including fodder, fiber and seed crops, pasture for foraging livestock, sod farms, ornamental nurseries, and silviculture, 2) landscape impoundments with no potential for public access or contact, 3) construction, including soil compaction, dust control, washing aggregate, and making concrete, 4) industrial uses such as livestock watering, aquaculture, stack scrubbing, street washing, boiler feed, ship ballast, once-through cooling, and re-circulating cooling towers.

For irrigation with reclaimed water treated to Level 2 standard, unless Level 1 disinfection is provided, the proposed regulation prohibits 1) grazing by milking animals on the irrigation reuse site for 15 days after irrigation with reclaimed water ceases, 2) harvesting, retail sale or allowing access by the general public to ornamental nursery stock or sod farms for 14 days after irrigation with reclaimed water ceases. According to DEQ, these exclusion periods are established based on the Environmental Protection Agency (EPA)'s report "Guidelines for Water Reuse" and are believed to be necessary to protect the public health and the environment.

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water has received, at a minimum, secondary treatment and standard disinfection, and meets all other applicable standards specified in 9 VAC 25-740-70.

<sup>4</sup> "Unrestricted access" means unlimited or minimally limited access by humans to areas where non-potable water, including reclaimed water, is used, resulting in a high potential for human contact.

<sup>5</sup> "Restricted access" means limited access by humans to areas where, non-potable water, including reclaimed water, is used, resulting in minimal or no potential for human contact.

However, allowing the use of reclaimed water treated to Level 2 standard for irrigation on restricted access areas with certain exclusion periods likely impose some hazards to public health. The proposed regulation requires that regulation and management of individual end users of reclaimed water shall be by the permittee<sup>6</sup> through service agreements or contracts between the permittee and the individual end users. The permittee is required to monitor the end users to verify compliance with the terms of their agreements or contracts. Monitoring shall include, at a minimum, metering the volume of reclaimed water consumed by end users.

The proposed regulation requires that the service agreement or contract between the permittee and the end users include the following language: the permittee shall reserve the right to terminate the agreement and withdraw service for any failure by the end user to comply with the terms and conditions of the agreement or contract if corrective action for such failure is not taken by the end user. However, the permittee will likely not have the capability of detecting all violations by the end users nor the incentive to go out of their way to find violations since the permittee is after all earning revenue by selling reclaimed water to the end users. Therefore, allowing the use of reclaimed water treated to Level 2 standard for irrigation on restricted access areas while providing an exclusion period would likely result in some incidences where milking animals graze on the irrigation reuse site prior to 15 days after irrigation with reclaimed water ceases, and some instances where harvesting, retail sale or access by the general public to ornamental nursery stock or sod farms prior to 14 days after irrigation with reclaimed water ceases. These incidences could be avoided by requiring that reclaimed water treated to Level 1 standard be used for irrigation on restricted access areas to ensure the protection of public health. Producing reclaimed water treated to Level 1 standard is of course more expensive than reclaimed water treated to Level 2 standard, though.

The proposed regulation will likely encourage both the supply of and the demand for reclaimed water. From the supply side, the proposed regulation will establish uniform conditions and standards for water reclamation and reuse and thus will reduce the uncertainty and facilitate the installation and operation of wastewater reclamation and reuse systems. The proposed regulation will also increase the awareness of the potential end users of the opportunities of using reclaimed water in a manner that is protective of public health and the environment and will likely increase the demand for reclaimed water.

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<sup>6</sup> Permittees include producer, distributor, and end users receiving reclaimed water from more than one supplier.

For new water reclamation and reuse systems that produce the reclaimed water, the benefit would be the potential profit from selling the reclaimed water or potential cost savings from self use of reclaimed water. The cost for new facilities would include three parts. 1) Cost of obtaining a VPA or VPDES permit. The owner of the new reclamation system and the owner of the reclaimed water distribution system or the reclaimed water agent are required by the proposed regulation to obtain either a VPA permit if a discharge to surface waters is not involved, or a VPDES permit if a discharge to surface waters is involved. According to the Department of Environmental Quality (DEQ), the cost of obtaining a VPA or VPDES permit ranges from \$750 to \$15,000 and from \$2,000 to \$24,000, respectively. 2) Cost of installing a water reclamation system, which will depend on the techniques and the capacity of the system. For example, DEQ estimates that a water reclamation system that could treat wastewater to Level 2 standard with a capacity of 0.5 Million Gallons per Day (MGD) would cost \$179,000<sup>7</sup> plus the real estate costs, marketing and distribution costs. It would cost another \$250,000 to modify the same facility to achieve Level 1 reclaimed water treatment standards without Biological Nutrient Removal (BNR)<sup>8</sup>. If the facility chooses to install the BNR technology to reduce the nutrient level in the treated water, it would incur an additional cost ranging from \$1.5 million to \$3 million. 3) Other compliance costs, including the time spent on record-keeping, reporting, costs of preparing the Reclaimed Water management (RWM) plan as required for permit applications, and other costs associated with activities required in the RWM plan. DEQ estimates that the time spent on record-keeping will be no more than 2 hours a month. No significant expenses are expected for reporting, except when the reclaimed water that does not meet the BNR condition of quality is used for irrigation. DEQ estimates that when the reclaimed water is used for irrigation that does not meet the BNR condition of quality, it will take the distributor approximately 10 hours for a one-time reporting process development system and then 2-3 hours a year thereafter. The time for preparing the RWM plan will vary depending on the site and facility specific factors but will generally be a one-time process of 10-15 hours with 2-3 hours a month thereafter for regular updates. According to DEQ, the facilities will also

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<sup>7</sup> This cost is estimated based on the costs of an existing wastewater treatment facility.

<sup>8</sup> “Biological Nutrient Removal (BNR)” means treatment which achieves an annual average of 8 mg/l total nitrogen (N) and 1 mg/l total phosphorus (P).

spend a small amount of time on monitoring of the end users<sup>9</sup>, periodical inspections to prevent cross-connections to a potable water system and backflow from industrial end users, as well as monthly monitoring of N and P loads by non-bulk irrigation reuses. The facilities will also spend some time on the education and notification program for reuses that requires Level 1 reclaimed water. The proposed regulation requires the producers or the distributors to develop an education and notification program for reuses that require Level 1 reclaimed water to ensure that end users and the public likely to have contact with reclaimed water are informed of the origin, nature, and characteristics of the reclaimed water; the manner in which the reclaimed water can be used safely; and uses for which the reclaimed water is prohibited or limited. The producers or the distributors are required to maintain a procedure to notify end users and the affected public of treatment failures at the reclamation system that can adversely impact human health, or result in loss of reclaimed water service.

Given that a rational facility will opt to install the water reclamation and reuse system only when the estimated long-term total benefit exceeds the estimated total cost, the proposed regulation will likely create a net benefit for new facilities in the long run.

Existing facilities will likely not incur any additional costs unless they are to be modified or expanded, while they will benefit from an increased demand for reclaimed water. According to DEQ, currently there are two existing water reclamation and reuse facilities in the Commonwealth. There are also 270 VPA permitted facilities and 1,115 VPDES permitted facilities that are allowed to install water reclamation and reuse systems under their permits, but have not chosen to do so. If the existing water reclamation facilities choose to modify or expand their systems, or if the currently permitted facilities choose to install the water reclamation systems, they may incur the second part of the cost as discussed above depending on the techniques they choose as well as some of the costs in part 3). Again, given that the facilities will opt to modify or install the water reclamation and reuse systems only when their estimated long-term total benefit from selling the reclaimed water or from self use of the reclaimed water exceeds the estimated total cost, the proposed regulation will likely create a net benefit for these two types of facilities in the long run.

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<sup>9</sup> According to the proposed regulation, monitoring shall include, at a minimum, metering the volume of reclaimed water consumed by end users.

The proposed regulation will likely benefit the potential end users by allowing and encouraging the use of reclaimed water for purposes where potable water is not necessary in terms of less public contact and low risk to public health and the environment. According to DEQ, the price of reclaimed water is estimated to range from 47% to 75% of the price of potable water depending on the areas and the price of reclaimed water treated to Level 1 standard is usually higher than reclaimed water treated to Level 2 standard. Some new end users, when choosing to use reclaimed water, will be required to obtain a permit if they receive reclaimed water directly from more than one reclamation system, satellite reclamation system, reclaimed water distribution system, or a combination thereof. As discussed above, the cost of obtaining a VPA permit ranges from \$750 to \$15,000, and the cost of obtaining a VPDES permit ranges from \$2,000 to \$24,000. New bulk irrigation users are required to develop a Nutrient Management Plan (NMP) if the reclaimed water used is not treated to achieve Biological Nutrient Removal (BNR)<sup>10</sup>. DEQ estimates that the average cost of developing a NNP is approximately \$650 for a typical Virginia farm. Bulk irrigation users<sup>11</sup> will be required to develop a site plan for each bulk irrigation reuse site, with each site plan taking about eight hours to finish according to DEQ. Given that the potential end users will come into the market only if the total benefit from using reclaimed water instead of potable water exceeds the total cost, the proposed regulation will likely create a net benefit for the potential end users. The proposed regulation will likely not impose any additional costs to the existing end users. Existing end users may actually benefit with a more competitive market for reclaimed water.

## **Businesses and Entities Affected**

The proposed regulation affects new facilities that produce and distribute reclaimed water and the potential end users. Existing facilities will not be affected unless they are to be modified or expanded. According to DEQ, currently there are two existing water reclamation and reuse facilities in the Commonwealth. There are also 270 VPA permitted facilities and 1,115 VPDES permitted facilities that are allowed to install water reclamation and reuse systems under their permits but have not chosen to do so.

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<sup>10</sup> “Biological Nutrient Removal (BNR)” means treatment which achieves an annual average of 8 mg/l total nitrogen (N) and 1 mg/l total phosphorus (P).

<sup>11</sup> “Bulk irrigation reuse” means reuse of reclaimed water for irrigation of an area greater than five acres on one contiguous property.



## **Localities Particularly Affected**

The proposed regulation affects all localities in the Commonwealth.

## **Projected Impact on Employment**

The proposed regulation will promote the reclamation and reuse of wastewater and will likely encourage the establishment of new water reclamation systems, which may create more jobs for citizens in the Commonwealth.

## **Effects on the Use and Value of Private Property**

The proposed regulation will likely encourage new facilities to produce and distribute reclaimed water, or the existing permitted facilities to install the water reclamation system. These facilities will likely receive a net benefit in the long run, which may have a positive impact on their asset values. The potential users will likely receive a net benefit from reduced costs of using reclaimed water, which may have a positive impact on their asset values.

## **Small Businesses: Costs and Other Effects**

According to DEQ, approximately 80% of the existing permitted facilities are small businesses. They are allowed to install water reclamation and reuse systems under their permits but have not chosen to do so. The proposed regulation will likely create a net benefit for small businesses that opt to install water reclamation and reuse systems. The proposed regulation will also benefit the potential small end users with reduced costs from using reclaimed water rather than potable water.

## **Small Businesses: Alternative Method that Minimizes Adverse Impact**

Small businesses will likely not be adversely affected.

## **Legal Mandate**

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.H of the Administrative Process Act and Executive Order Number 21 (02). Section 2.2-4007.H requires that such economic impact analyses include, but need not be limited to, the projected number of businesses or other entities to whom the regulation would apply, the identity of any localities and types of businesses or other entities particularly affected, the projected number of persons and employment positions to



be affected, the projected costs to affected businesses or entities to implement or comply with the regulation, and the impact on the use and value of private property. Further, if the proposed regulation has adverse effect on small businesses, Section 2.2-4007.H requires that such economic impact analyses include (i) an identification and estimate of the number of small businesses subject to the regulation; (ii) the projected reporting, recordkeeping, and other administrative costs required for small businesses to comply with the regulation, including the type of professional skills necessary for preparing required reports and other documents; (iii) a statement of the probable effect of the regulation on affected small businesses; and (iv) a description of any less intrusive or less costly alternative methods of achieving the purpose of the regulation. The analysis presented above represents DPB's best estimate of these economic impacts.