



Economic Impact Analysis

Virginia Department of Planning and Budget

9 VAC 25-740 – Regulation for Wastewater Reclamation and Reuse

State Water Control Board

December 4, 2002

The Department of Planning and Budget (DPB) has analyzed the economic impact of this proposed regulation in accordance with Section 2.2-4007.G of the Administrative Process Act and Executive Order Number 21 (02). Section 2.2-4007.G 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. The analysis presented below represents DPB's best estimate of these economic impacts.

Summary of the Proposed Regulation

The General Assembly establishes a purpose of the State Water Control Law in §62.1-44.2 of the Code of Virginia. Its purpose is to promote and encourage the reclamation and reuse of wastewater in a manner protective of the environment and public health. Moreover, the General Assembly authorizes in §62.1-44.15:15 of the Code of Virginia that the State Water Control Board promote and establish requirements for the reclamation and reuse of wastewater as an alternative to directly discharging pollutants into state waters.

The proposed regulation establishes the treatment level necessary before reclaimed water can be used for various purposes and the technical standards under which reclamation and reuse facilities can be operated. All new and expanded wastewater reclamation and reuse systems may now be required to get a permit from the Department of Environmental Quality. In order to

obtain a permit, reclamation and reuse systems have to meet reclaimed water quality requirements and design, operation, storage, and maintenance standards established by the regulation. The proposed regulation establishes the level of treatment of reclaimed wastewater required for various categories of use. For uses of reclaimed wastewater not among the categories listed in the regulation, the State Water Control Board is allowed to conduct a case-by-case review and prescribe specific reclaimed wastewater quality requirements. The proposed regulation also requires that reclamation and reuse systems meet specific design, operation, storage, and maintenance standards that are considered necessary to protect public health and the environment.

Estimated Economic Impact

Current Policy:

Reclamation: Under current policy, all facilities that produce reclaimed water (wastewater that has gone through various levels of treatment and disinfection) are required to get Virginia Pollution Abatement (VPA) permits or Virginia Pollution Discharge Elimination System (VPDES) permits. Facilities that do not discharge reclaimed water into surface water are required to get VPA permits and facilities that do discharge reclaimed water into surface water are required to get VPDES permits. While these permits allow for the production and disposal of reclaimed water, they do not prescribe any technical standards concerning the design, operation, storage, and maintenance of these operations.

Most facilities producing reclaimed water fall under two categories: industrial plants and municipal treatment works. While both are required to get either a VPA permit or a VPDES permit depending on whether they discharge reclaimed water into surface water or not, municipal treatment works also fall under the purview of Sewage Collection and Treatment (SCAT) Regulations. These regulations establish standards for the operation, construction, and modification of a sewerage system or treatment works (including land treatment systems).

Reuse: Under current policy, with the exception of some irrigation projects, all other facilities using reclaimed water are not required to get a permit. The use of reclaimed water for some types of irrigation (such as for pastures, non-food crops, and silviculture) is classified as a land treatment system and has been regulated indirectly through the VPA and VPDES permits

issued to the producers/suppliers of reclaimed water and SCAT regulations governing the operation of land treatment systems. Suppliers of the reclaimed water (usually municipal treatment works) are responsible for ensuring that the reclaimed water is applied in a way that does not violate the terms of their VPA or VPDES permits and the SCAT regulations.

All other uses of reclaimed water, such as for industrial cooling, fire protection, and street washing, are not directly covered under an existing regulation. For example, Giant Refinery is one of a few non-irrigation facilities in Virginia that uses reclaimed water. While the Hampton Roads Sanitation District, the supplier of the reclaimed water, requires a VPA or VPDES permit to produce reclaimed water, Giant Refinery does not require a permit to use reclaimed water. Under these circumstances, the proper and safe use of reclaimed water is ensured informally through the supplier's VPA or VPDES permit (the informal guidelines for the sale and use of reclaimed water are determined by the Department of Environment Quality (DEQ), the Virginia Department of Health (VDH), and the Department of Conservation and Recreation (DCR) on a case-by-case basis).

Proposed Regulation:

The proposed regulation establishes conditions and sets standards for the reclamation and reuse of industrial wastewater and domestic sewage from residential dwellings, commercial buildings, and industrial and manufacturing facilities and institutions.

The proposed regulation could require that all new reuse facilities obtain a VPA or VPDES permit (cost of getting a VPA permit ranges from \$7,500 to \$10,500 and the cost of getting a VPDES permit ranges from \$4,200 to \$24,000). Reuse facilities will now include all irrigation projects that apply reclaimed water at a rate less than the supplemental irrigation rate (the rate at which undesirable plant water stress does not occur and the field capacity from any specific irrigation event is not exceeded). Irrigation projects that apply reclaimed water at rates in excess of supplemental irrigation rates will continue to be considered land treatment systems and will be covered under SCAT regulations and VPA or VPDES permits issued to the supplier. Use of reclaimed water for industrial processes such as cooling and boiler feed and for urban non-potable uses such as street washing and fire protection will now be covered under the proposed regulation.

Note: An unintended consequence of the proposed regulation might be the overapplication of reclaimed water in farms and other facilities using this water for irrigation. The exemption of irrigation projects that apply reclaimed water at rates which exceed supplemental irrigation rates from the proposed regulation raises concerns that some farms might overapply reclaimed water so that they are exempt from the requirements of this regulation. However, according to the Virginia Department of Health, the SCAT regulations impose more restrictive requirements (such as mandatory ground water monitoring, large buffer zones, and strict access control to the sites) than is being proposed by this regulation. Thus, there is no incentive for the overapplication of reclaimed water at these facilities.

The proposed regulation requires that all new facilities using reclaimed water ensure that the water is treated to a certain level—secondary (basic disinfection) or tertiary (high level of disinfection)—depending on its intended use and the potential for public contact. For example, facilities using reclaimed water such that there is a high chance that the water might come into contact with the public, such as using reclaimed water for firefighting or to irrigate parks and golf courses, are required to use reclaimed water treated to the tertiary level. Others using reclaimed water in a way that provides little or no potential for public contact are required to treat the reclaimed water to the secondary level. The regulation lists the various categories of reuse of reclaimed water and the corresponding reclaimed water quality requirements. For categories of uses not listed in the regulation, the State Water Control Board is allowed to conduct a case-by-case review and determine the water quality requirements.

The proposed regulation also requires that all new reclamation and reuse facilities meet certain specific design, operation, storage, and maintenance standards. Currently, VPA and VPDES permit regulations broadly lay out the procedures and requirements to be followed in order to get a permit, but do not prescribe any specific standards. The standards being proposed in this regulation are consistent with EPA guidelines and similar to standards adopted in states such as California and Florida that have regulations governing both the reclamation and reuse of wastewater (most other states have regulations covering the reclamation but not the reuse of wastewater) and include:

- System Reliability Requirements

- Use Area Control Requirements (including standards for notification and advisory signs, cross connection controls, setback distances for irrigation with reclaimed water, and access controls to areas irrigated with reclaimed water)
- Application and Distribution System Requirements (for irrigation with reclaimed water)
- Storage Requirements (for reclaimed water to be used for irrigation)
- Irrigation Rates and Nutrient Management Plans (for sites irrigated with reclaimed water)
- Operation and Maintenance Manuals
- Monitoring Requirements

Existing facilities currently permitted by DEQ to produce, distribute, or use reclaimed water need not comply with the regulation unless the facilities are modified/expanded or unless the treatment process is altered. Existing permitted facilities include all facilities currently producing reclaimed water that are directly regulated under a VPA or VPDES permit and all facilities using reclaimed water that are regulated indirectly through their supplier's VPA or VPDES permit. If existing facilities are modified/expanded or if the treatment process is altered, the owner of the facility would need to apply for a modification to the existing permit. However, the conditions of the regulation will apply only to the expansions, modifications, or changes made to the treatment process.

Existing reclamation and reuse systems that have not been permitted by DEQ will now be required to obtain a VPA or VPDES permit in accordance with the proposed regulation. Existing unpermitted facilities include all facilities currently reusing reclaimed water under informal guidelines established by DEQ, VDH, and DCR.

However, DEQ does not anticipate permitting all facilities reusing reclaimed water. If the producer/supplier assumes responsibility to ensure that reclaimed water is used in accordance with this regulation, the user of the reclaimed water may not need to get a VPA or VPDES permit. For example, taking the case of farms irrigating with reclaimed water. Under current policy, the supplier of the reclaimed water, usually a municipal wastewater treatment facility, is responsible for ensuring the proper application and use of the reclaimed water. If the municipal treatment facility continues to take responsibility to ensure that the reclaimed water is applied to the land in accordance with this regulation, individual farms may not be required to get a VPA or

VPDES permit. However, if the municipal treatment facility chooses not to take responsibility for the proper use of reclaimed water, DEQ will decide whether individual farms are now required to get VPA or VPDES permits. If they are required to get a permit, it will impose significant additional costs on these reuse facilities. If they are not required to get a permit, there may be significant environmental costs of not having these facilities meet the reuse requirements. The regulation does not explicitly address this issue and creates uncertainty about its eventual impact.

Economic Impact:

Water is a limited resource that is not generally allocated by the forces of supply and demand in a freely operating market. Expanding development, an increasing population, and adverse climatic conditions have created a scarcity of water, especially potable water. Potable water requires a much higher level of treatment and disinfection than that provided by secondary or tertiary treatment. The use of reclaimed water treated to the secondary or tertiary level in such a way that it does not create a public health or environmental hazard will lead to a more efficient allocation of existing resources: (1) using water of quality that is commensurate with the risk associated with its use will lead to less waste of resources and (2) using lower quality reclaimed water for certain purposes will increase the available supply of potable water.

A 2000 DEQ report to the Governor and the General Assembly determined after reviewing data from existing reclamation and reuse projects that with proper treatment of reclaimed water and with proper operation and management of the reuse project, water reclamation and reuse can be implemented in a way that is protective of public health and the environment. 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 prohibits the use of reclaimed water for certain uses and, for other uses, it determines the minimum level of treatment to be provided to reclaimed water before it is reused. It also prescribes specific standards for operation and management of reclamation and reuse systems in an effort to reduce the risk to public health and the environment.

The regulation is likely to encourage the reclamation and reuse of wastewater by: (1) establishing uniform conditions and standards for the reclamation and reuse of wastewater that reduce the uncertainty and hence the costs associated with setting up and operating wastewater

reclamation and reuse systems, (2) increasing the awareness of potential end-users of the possibilities of using reclaimed water, and (3) providing regulatory oversight such that fears regarding health and environmental consequences of using reclaimed water are allayed.

On the other hand, the proposed regulation is likely to discourage the reclamation and reuse of wastewater by significantly increasing the cost of operating these facilities: (1) by imposing additional design, operation, storage, and maintenance standards on reclamation and reuse systems, (2) by imposing reclaimed water quality requirements on facilities reusing reclaimed water, and (3) by requiring reuse systems to get a VPA or a VPDES permit. If the additional costs of compliance raise the price of reclaimed water such that it costs more than potable water, the proposed regulation is likely to produce an effect opposite of its intended effect, i.e., it will discourage the reclamation and reuse of wastewater. Thus, in order for the regulation to have its intended effect, (1) the net benefit of selling reclaimed water has to be greater than the cost the cost incurred in simply discharging the reclaimed water and (2) the cost of using reclaimed water has to be less than the cost of using potable water.

Under current policy, DEQ estimates that on average the price of reclaimed water is approximately half that of potable water. For example, the Hampton Roads Sanitation District sells reclaimed water to Giant Refinery at \$1.50 per 1,000 gallons. If they were to use potable water, Giant Refinery would be paying \$3.25 per 1,000 gallons. The difference in cost between potable and reclaimed water would be less in rural and not-so-densely populated areas where there is less demand for potable water. However, the cost of getting a VPA or VPDES permit was tripled in July 2002 (it now ranges from \$7,500 to \$10,500 for a VPA permit and from \$4,200 to \$24,000 for a VPDES permit). Combined with the additional compliance costs associated with the proposed regulation, this is likely to raise the price of reclaimed water.

- For Reclamation Facilities: Facilities that produce reclaimed water will face increased costs of compliance as a result of the additional design, operation, storage, and maintenance standards. Assuming that reclamation facilities cannot charge more for reclaimed water than what it costs to buy potable water, the net economic benefit from selling reclaimed water will be the increased revenue from selling reclaimed water less the increased compliance cost of doing so. If the compliance costs associated with the proposed regulation are large enough and the net economic benefit from selling reclaimed

water negative enough, some facilities producing reclaimed water will choose to get a VPDES permit and discharge the water into surface water. Under these circumstances, the supply of reclaimed water will fall.

- For Reuse Facilities: Facilities that use reclaimed water (except for some indirectly permitted irrigation projects) will face increased costs of compliance as a result of the additional design, operation, storage, and maintenance standards, the reclaimed water quality requirements, and the permit costs. Additional design criteria such as irrigation rates and nutrient management plans are likely to raise the engineering and construction costs associated with these facilities. Setback distance requirements are likely to significantly increase costs for irrigation-related reuse projects. Continuous monitoring requirements for reuse facilities to ensure that water of appropriate quality is being used are also likely to increase costs, especially for smaller reuse facilities. If the reuse facility is required to obtain a VPA or VPDES permit, it would cost them between \$4,200 and \$24,000. The net economic benefit from using reclaimed water will be the cost savings from using reclaimed water instead of potable water less the increased cost of compliance. If the compliance costs are so large that they swamp any cost savings associated with shifting toward the use of reclaimed water, some reuse facilities will choose to use potable water. Under these circumstances, the demand for reclaimed water will fall.

The additional costs imposed have to be balanced against a potential increase in protection to public health and the environment from the proposed regulation. However, DEQ has no estimates regarding the potential increase in compliance costs and in the price of reclaimed water as a result of adopting the proposed regulation. Nor is there any estimate of the increased protection provided to public health and the environment from these additional requirements. While a review of ground water monitoring data of some permits issued to land irrigation projects by the 2000 DEQ report indicated that inadequate design, operation, storage, and maintenance standards may have contributed to a negative impact to ground water quality, no direct linkage was established.

The Hampton Roads Sanitation District, represented on the technical committee advising DEQ on the proposed regulation, believes that the proposed regulation could impose an

additional one-time compliance costs on reclamation and reuse of wastewater for industrial purposes, but that the increase in compliance costs is not likely to outweigh the economic benefits of selling and using reclaimed water. On the other hand, the Virginia Agribusiness Council, also represented on the technical committee advising DEQ on the proposed regulation, believes that the additional compliance costs imposed by the proposed regulation, especially for non-farm facilities such as golf courses and athletic fields using reclaimed water for irrigation, are likely to be prohibitive enough to actually discourage the use of reclaimed water to lower than existing levels. Yet another member of the technical advisory committee believes that the proposed regulation will increase compliance costs for reclamation facilities, but not so significantly as to make the project infeasible (these facilities would still be considered profitable using net present value calculations over a 20 year period). However, the increased compliance costs (especially additional design costs, setback distances, and monitoring requirements) faced by reuse facilities could discourage smaller reuse facilities and reuse facilities located in rural areas (where the cost of potable water is low). For all other types of reuse facilities, especially those located in urban areas where the price of potable water is higher, the member believes that the increase in compliance costs is not likely to outweigh the long-term saving from using reclaimed water.

Conclusion:

The use of reclaimed water could lead to a more efficient allocation of existing resources by allowing water quality to be commensurate with the risk associated with using it. The proposed regulation is likely to encourage the reclamation and reuse of wastewater by reducing uncertainty, increasing awareness of reclaimed water as an alternative source of water, and allaying concerns about health and safety. On the other hand, the regulation imposes significant additional compliance costs on reclamation and reuse systems. The extent to which the additional costs are necessary to protect public health and the environment is not known. However, if the compliance costs are large enough, the regulation could result in a decline in the reclamation and reuse of wastewater and have the opposite of the intended effect of this regulation.

Businesses and Entities Affected

The proposed regulation affects all facilities that produce reclaimed water. These facilities now have the option to either sell the reclaimed water or to discharge it under a VPA or

VPDES permit. The net impact of the additional revenue earned from selling reclaimed water and the additional compliance cost imposed by this regulation will determine the number of facilities that choose to sell reclaimed water. The proposed regulation also affects businesses and entities that are potential users of reclaimed water. Instead of potable water, these facilities can now use reclaimed water of lower quality, depending on its intended use. The decision to use reclaimed water will be determined by the net impact of the cost savings from using reclaimed water instead of potable water and the additional compliance costs. The proposed regulation could also affect users of potable water. Any substitution toward reclaimed water and away from potable water for some categories of uses is likely to increase available supply of potable water for other uses.

Localities Particularly Affected

The proposed regulation affects all localities in the Commonwealth. If the regulation does result in the increased use of reclaimed water, some localities (especially in the western non-tidal region of the state) dependent on surface water flows could be adversely affected by a reduction of stream flows where treated wastewater was previously discharged to surface waters. However, these localities could benefit from the lower levels of surface water contamination as a result of increased reuse. Some localities dependent on ground water supply could see an increase in groundwater supply. However, this would have to be balanced against a potential degradation of groundwater quality.

Projected Impact on Employment

The proposed regulation is not likely to have a significant impact on employment.

Effects on the Use and Value of Private Property

The proposed regulation could increase the profitability of facilities producing wastewater. Instead of discharging the treated wastewater under a VPA or VPDES permit, facilities producing reclaimed water could now sell the reclaimed water. The proposed regulation could lower costs for facilities currently using potable water that could use reclaimed water at no significant additional risk to health and the environment. The proposed regulation could also affect the production and use of potable water by potentially increasing the available supply of

potable water. The price of potable water is driven to a large extent by the need to meet financing costs incurred in the construction of the water treatment plant. However, if facilities producing potable water are currently operating at full capacity, the potential increase in the supply could benefit the Commonwealth by eliminating or postponing the need to construct new potable water treatment plants. On the other hand, if facilities producing potable water are not operating at full capacity, the potential increase in supply will not have a significant effect of the production of potable water and could have the perverse effect of raising its price.