

Effluent re-use for potable water supply

Position statement

June 2011

Our position

Treated effluent is recognised as an important, reliable and valuable resource, particularly in a changing climate (ref 1). We support and encourage water companies to consider indirect effluent re-use as an option for increasing public water supply where a deficit in water supplies is forecast. This option should be considered within the options appraisal process which aims to balance the development of new resources and implementing demand management - the 'twin track' solution. Effluent re-use schemes vary in operational specification, dependent on the water supply requirements and where the water is needed.

Benefits

- Effluent re-use schemes maximise the water available for public water supply, particularly where the environment is over-abstracted and/or water is scarce. Many unplanned indirect effluent re-use schemes are already in operation, particularly in south east England, and provide significant volumes of water for public water supply.
- Instead of large-scale infrastructure developments such as reservoirs and new abstractions, effluent re-use can be a viable alternative to increasing supply. These schemes can be more cost effective, prevent potential environmental damage at new sources of supply and can also be operated when required rather than all of the time.
- Direct effluent re-use with suitable treatment can also be an appropriate option for industrial supplies, reducing demands on the potable supply system.

Issues

- **Changes to the riverine environment and water quality** - Effluent re-use has the potential to have a negative impact on the environment if the scheme is not assessed correctly and the operation of the scheme is not well managed once implemented. Changes to water quality and river flows could result in impacts on ecology, fisheries, navigation and water available for other uses if the scheme is not well assessed and the impacts mitigated. In some cases wastewater effluent makes up a large proportion of river flows and at these locations effluent reuse could have particularly significant impacts.
- **Public health and perception** - there is a negative association of effluent re-use and public health concerns. There is a public perception that recycled water is less clean than water from other sources. This perception can also affect the success of effluent re-use proposals and trials and so they should be carefully planned and assessed.
- **Carbon and scheme costs** - Carbon and greenhouse gas operating emissions tend to be higher for effluent re-use than for other comparable water supply options due to the process of reverse osmosis that is often used to treat wastewater for re-use (ref 2). Reverse osmosis

treats water to a very high level, but is energy intensive and therefore may be costly and result in high carbon emissions. High carbon costs influence the cost assessment through options appraisal where financial, environmental and social costs are considered. For this reason, effluent re-use may be better suited to meeting short-term peak demands by supporting other water supply actions, especially if reverse osmosis is required.

Solutions

- Environmental impact assessment and options appraisal of any proposed effluent reuse scheme is important to protect the environment and other interests from any negative impacts of changes to the flow regime and water quality that effluent re-use may cause. The process looks at the costs and benefits and can provide recommendations to minimise negative impacts.
- Negative public perception can be managed with effective and well planned communications. Through careful communications and revision of its effluent re-use scheme, Essex and Suffolk Water turned around negative public perception and successfully operates Langford water recycling scheme (ref 3) which uses indirect effluent re-use to increase water available for treatment.
- Improved technology and/or alternative methods of wastewater treatment, such as biological, chemical and UV light treatment, may have a lower financial and carbon cost than the frequently used method of reverse osmosis. We expect water companies to consider all appropriate treatment technologies and demonstrate which is appropriate.
- In May 2007 we commissioned MWH to undertake a study looking at effluent reuse opportunities across the south east of England. Phase one of the report (ref 4) outlined six feasible options including those currently considered by water companies in the south east (excluding Thames Water). Phase two of the report (ref 5) looked in detail at the effectiveness of each scheme and concluded that it is technically feasible to implement such schemes cost-effectively and with no deterioration in water quality.

Roles

- **Environment Agency** - we influence water companies to consider effluent re-use as a potential solution through the Water Resource Management Plan (WRMP) statutory process. We are statutory consultees for WRMPs, make representations to Government on the content of the plans and advise Government on the plans. The operation of effluent re-use schemes also requires ongoing water quality permitting and regulation to ensure water quality standards are maintained, particularly where the water is recycled for potable use. Planning and regulation functions must be joined up to ensure successful implementation and operation of effluent re-use schemes.
- **Water companies** - water companies have a statutory duty to prepare, consult, publish and maintain a WRMP. As part of this plan, water companies should consider effluent re-use as a way to increase water supplies where a shortfall is forecast for the future. Water companies are also responsible for meeting drinking water standards set by DWI.

- **Government** - The Secretary of State/Welsh Ministers direct water companies on the contents of their WRMP and must be satisfied that their preferred options are sustainable, appropriate and will resolve any deficits in forecasted water availability. Government can also influence how effluent re-use is approached by reviewing its use in influential publications, such as the Water White Paper and the revised Strategic Policy Statement on Water.
- **Drinking Water Inspectorate** - DWI independently assesses water company activities and ensure that water supplies in England and Wales meet legal drinking water standards. DWI influences, monitors and reports on schemes such as effluent re-use.

Background

- Effluent re-use involves using fully treated wastewater as a source of potable water. There are two classifications of effluent reuse – direct and indirect. Direct effluent re-use involves putting recycled and appropriately treated wastewater directly into public water supplies for use as potable water. Such schemes often have public concerns due to the direct link with wastewater and perceived risk to public health, despite treated wastewater often being of better quality than river water. Direct re-use is not used in the UK for potable uses but is more common practice for non-potable applications in industry and irrigation. Indirect effluent re-use still involves returning treated wastewater back into a public water supply, but the treated water is first returned to a watercourse or reservoir before being abstracted downstream and treated again to potable standards. This is generally considered more publicly acceptable as the company is abstracting river or reservoir water rather than wastewater. Any perception of risk to public health is reduced as there will be a lag between the discharge and abstraction point; this allows for increased dilution and/or residence time and accompanying settlement of potential contaminants. Effluent re-use is widely used internationally to increase water supplies and there are many examples of both indirect and direct schemes in the USA, the Mediterranean, the Middle East, Africa, East Asia and Australasia (Ref 4 and 5).

Notes

- Ref 1 - [Environment Agency, Water for people and the environment: strategy for England and Wales](#), March 2009.
- Ref 2 - Greenhouse gas emissions of water supply and demand management options, Environment Agency Science Report SC070010/SR (2008)
- Ref 3 - [Essex and Suffolk Langford recycling scheme case study](#)
- Ref 4 - Effluent reuse study, phase 1. MWH for the Environment Agency, May 2007.
- Ref 5 - Effluent reuse study, phase 2. MWH for the Environment Agency, May 2007.