



Environmental Newsletter

Prepared WG Environment

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Water use and minimisation

1- Summary

EIGA Working Group 5 – Environment has compiled this environmental newsletter to give information to EIGA members, specifically to site managers, Directors, technical managers, company environmental specialists and National Trade Associations on best practice for managing water and waste water and minimising usage and discharges.

2- Introduction

Water is becoming an increasingly expensive resource with mains, sewerage and trade effluent charges rising. In addition to which the impacts of climate change are being felt across Europe. Over the past thirty years, droughts have dramatically increased in number and intensity in the EU. The number of areas and people affected by droughts went up by almost 20% between 1976 and 2006. One of the most widespread droughts occurred in 2003 when over 100 million people and a third of the EU territory were affected. The cost of the damage to the European economy was at least € 8.7 billion. The total cost of droughts over the past thirty years amounts to € 100 billion.

In 2006 and early 2007 the Commission carried out an in-depth assessment of water scarcity and droughts in the European Union. While "drought" means a temporary decrease in water availability due for instance to rainfall deficiency, "water scarcity" means that water demand exceeds the water resources exploitable under sustainable conditions. At least 11% of the European population and 17% of its territory have been affected by water scarcity to date. Recent trends show a significant extension of water scarcity across Europe.

As a result of this assessment the Commission presented an initial set of policy options to increase water efficiency and water savings in a Communication published in July 2007. In addition to which, in October 2000 the 'Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy' (EU Water Framework Directive or WFD) was adopted. The purpose of the Directive was to establish a framework for the protection of inland surface waters (rivers and lakes), transitional waters (estuaries), coastal waters and groundwater. Finally, there is huge potential for **water saving** across Europe. Europe continues to waste at least 20% of its water due to inefficiency. (Ecologic, Report on EU water saving potential, June 2007.)

Against this background EIGA has written a newsletter to bring together advice to members to help them focus on water usage and minimisation. Many of the processes used in industrial gas operations use water such as water in the cooling towers for air separation plants, water for cleaning vehicles and equipments, process water for manufacturing dissolved acetylene.

Most companies and organisations know how much water they use, but may not always use this knowledge to help them reduce the amount of water consumed. By using less water, companies save money on both water supply and wastewater disposal and minimise their impact on the environment. Taking action to save water may also allow companies to recover raw materials or product previously lost in effluent streams.

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3- How to minimise water use

EIGA has published a number of documents that are a good basis from which to focus on issues related to water use and water minimisation.

- *Guidelines on environmental management systems (IGC Doc 107)* includes checklist in the Appendix 4 on how to conduct an initial environmental assessment on the use of water and waste water.
- *Environmental issues guide (IGC Doc 106– section 4.4 Energy and water use)* covers some of the basic issues on water use.
- The EIGA publication series on environmental impacts for different process and operations (e.g. *Environmental impacts of air separation units Doc 94*) also covers specific environmental issues related to processes.
- There is also some good guidance in *EIGA publication Good environmental management practices for industrial gas industry IGC Doc 88*

The table below provides some ideas for best practice for activities that use significant quantities of water by EIGA member companies.

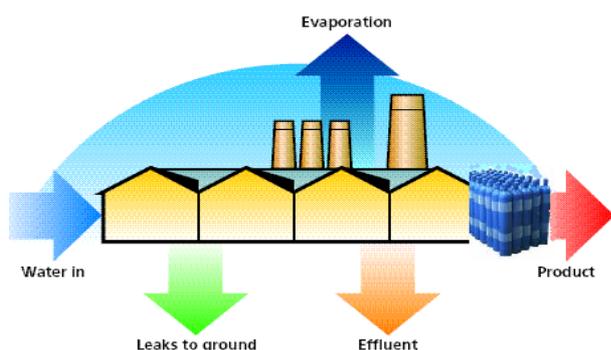
Activity using water	Examples of best practice solutions to minimise water usage and waste water
Boiler Make up water	<ul style="list-style-type: none"> • Avoid excessive chemical feed through tight control of water chemistry. • Run boiler at optimum concentration cycles to minimize chemical loss, wastewater discharges, and makeup water consumption. • Consider using automatic blow down equipment (changing from manual to automatic can reduce boiler energy use by 2 – 5% and reduce blow down losses by up to 20%). • Consider improvements to water quality for feed water to reduce blow down rates.
Cooling tower and systems make up water	<ul style="list-style-type: none"> • Minimize leaks through preventive maintenance (check for excessive drift and splash). • Reduce controlled losses (e.g. look at bleed losses, concentration cycles). • Maintain proper level of corrosion inhibitors to extend life of equipment. • Ensure all float valves are set within operating ranges. • Investigate fitting Variable Speed drive motors to cooling tower fans so that cooling system is better matched to system heat load.
Cooling tower and process boiler -blow down	<ul style="list-style-type: none"> • Run cooling tower/boiler at optimum concentration cycles to minimize chemical loss, wastewater discharges, and makeup water consumption. • Purchase water treatment chemicals in bulk or returnable containers instead of drums, where practical.
Cylinder testing	<ul style="list-style-type: none"> • Recycle cylinder test water to the extent practical. • Discharge through a permitted outfall or sewer connection.
Vehicle washing	<ul style="list-style-type: none"> • Recycle water to the extent practical. • Use non potable water where practical. • Wash vehicles in wash bays or other designated areas. • Discharge through a permitted outfall or sewer connection.

Water balance

In addition to employing good environmental practice sites that use water should also consider developing a water balance for the site to work out how much you use. Such an approach accounts for where water enters and leaves a site, and where it is used within the business. It typically contains information about the amount of water used by each main process and, for some processes, can be very detailed. Presenting a water balance as a diagram makes it easy to understand and use as a management tool. The type of water used on-site and the type of wastewater generated by site operations/activities will determine how much a company pays for water supply and wastewater disposal. Typically water can come from a number of sources and be discharged as waste water in a number of ways.

Water sources	Wastewater types
Municipal water Supply (potable and non-potable)	Domestic wastewater (sewage)
Water from groundwater (borehole) and surface water	Industrial waste water and process effluents
Recycled water from another industrial source	Surface drainage (roof and site run-off)
Collected rainwater	Discharge to surface water and groundwater

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A very simplistic approach to water use on the site can be quickly developed by looking at inputs and outputs to the process.

3.1- Action plan for water minimisation

Sites should consider developing a site action plan for water minimisation and would consider the following key points in such a plan.

Step 1: Obtaining commitment and resources

As with any environmental improvement programme, commitment from senior management is vital for success. This should be obtained at an early stage - particularly if you do not have the necessary authority to commit resources to produce a detailed water balance or to investigate and implement water saving opportunities. It may be easier to obtain top-level commitment once you have started to collect information and develop your water balance (step 2) and are in a position to highlight current costs and usage, identify the need for more information and suggest the scope for potential savings; and highlight some 'quick win' opportunities.

Step 2: Preliminary review

A preliminary site review typically consists of:

- 1) Gathering existing data, e.g. annual water use and costs,
- 2) Conducting a brief assessment of the major gaps in information, and,
- 3) Deciding how detailed a water balance is appropriate for your company.

The preliminary review may also involve: estimating potential cost savings from water saving measures; deciding if additional budget is required for obtaining missing information and/or constructing a water balance e.g. installing temporary water meters.

A preliminary review can be conducted relatively quickly by and may involve a walk round your site or building. During the walk round you may take a note pad to make sketches and notes on activities and operations that use water. You may also wish to inform other people what you are doing and ask them for their views on water use and current practices. Your tour of the site and the information you obtain may highlight some 'fast start' projects that will help you to secure top-level commitment.

You may also consider developing a checklist and using the checklist in Guidelines on environmental management systems (EIGA IGC Doc 107)

Step 3: Drawing the water balance picture to identify improvements

In order to start pulling together a detailed picture for the site collect information that already exists within the company. Check whether the information appears accurate and consistent. For example, check the meter readings on your latest water bill and find out when your water meter(s) was last calibrated. Type of data that should be considered is shown in the table below.

Type of data/information	Description
Water supply and treatment costs	Water supply bills, water licence fees, pumping, chemicals, operating and labour costs
Water treatment	System type and capacity
Water and effluent quantities	Meter readings in and out of site, on individual machines/process areas Data on rainfall or groundwater inputs From water treatment reports
Water and effluent quality	Analysis of on-site water treatment and effluent samples (either in-house, by external laboratories or by water company) Equipment specifications from suppliers

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Effluent treatment costs	Pumping, chemicals, operating, maintenance and labour costs
Effluent discharge costs	Industrial waste water and sewage bills Charges for discharge to controlled waters
Effluent removed off-site in tankers	Waste disposal contractor's bills for transport, treatment and disposal Quantities and quality off tankered liquids
Site plans	Water distribution and drainage plans, including water sources and location of meters
Details of process or unit of operation	Process flow and pipe/process technical drawings, including manufacturers' specifications

Summary

- The first step is to produce a pictorial representation of your site. All premises, whether a complex site or a single building, can be described by a series of activities or operations.
- Identify and mark on your picture: major uses of water, the location of on-site water meters; and the points at which domestic wastewater and/or Industrial waste water and process effluent enter the site drainage system.
- For more complex sites, use a site plan and process flow diagrams to help you produce a pictorial representation of the site.
- Use your water balance to identify opportunities to reduce water use and effluent generation. Once a water balance has been formulated, determine projects and actions for improvements. In order to ensure focus the site may choose to regular measure and monitor usage and also set targets for improvement.
- Plans and targets should also be regularly reviewed.

4- Actions

The EIGA member companies must make sure that they:

- consider best practice techniques for minimising water usage,
- comply with water abstraction licences,
- comply with all regulatory discharge licences for waste water.

References

http://ec.europa.eu/environment/water/pdf/1st_report.pdf

http://ec.europa.eu/environment/water/water-framework/newsletter/index_en.htm

Communication for the Commission to the European Parliament and the Council, Addressing the challenge of water scarcity and droughts in the European Union, {SEC(2007) 993}, {SEC(2007) 996}.

Comments

The EIGA WG-5 members welcome any feedback on this and other publications.

If you need any more information or would like to make any comments please contact your WG-5 representative or the WG-5 Chairman.

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