

**WAT-G-067**

**EASR Guidance:**

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**Permit Activity: Discharges from water treatment works**

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# Purpose

This document provides information and guidance for anyone discharging effluent from a water treatment works or a water supply system which is authorised by a permit under The Environmental Authorisations (Scotland) Regulations.

This guidance provides specific advice on water treatment works discharges. You need to read this in conjunction with WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment.

This guidance does not cover any other permissions that may be required.

# Understanding the activity

Treatment of abstracted water to potable standards normally consists of the following stages.

1. **Screening**. Leaves, twigs and any large debris are removed by screens.
2. **Clarification**. Removal of suspended and colloidal matter.
	1. A chemical coagulant may be added at this stage. The main coagulants used are aluminium sulphate, iron salts and polyelectrolytes. This reacts with the water to form floc, which settles and carries any suspended particles with it. The floc also traps bacteria and absorbs colour, and as it settles it forms a sludge which is removed for disposal leaving behind a clarified water.
	2. Most treatment works have to filter their water. Filters are commonly sand or anthracite or activated carbon. More modern technology may use membrane as a filtration step e.g. reverse osmosis, nano filtration, micro filtration, which separates dissolved substances from water by forcing the water through a membrane. Membrane technology removes virtually all substances including heavy metals, bacteria, cysts and viruses
3. **Disinfection**. This can be by chlorination, chloramination, ozonation or UV. Chlorination is used as the primary disinfection process for the public water supply system. Chloramination may occasionally be used as an alternative form of disinfection to chlorination. We consider that the environmental risk from the use of chloramines is comparable to that from chlorine.
4. **pH correction**. Lime (calcium hydroxide) is added to make the water less acidic and less corrosive to metal pipes.

The process is often simplified at small works with high quality source water. Additional stages can also be added where the source water requires more treatment.

The treated water is then stored in large clear water tanks and man-made lakes (service reservoirs) prior to distribution in the potable water supply system to consumers.

Discharges from the water treatment works and water supply systems may contain pollutants such as suspended solids, granulated activated carbon fines, chlorine, aluminium, iron or polyelectrolytes which can pose a risk of pollution of the water environment. The pH may also differ from that of the receiving waters.

Discharges from water treatment works and water supply systems arise from a range of activities associated with the process of producing potable water such as:

* Filter backwashing.
* Treatment plant reject stream.
* Cleaning of pipes and storage systems.
* Emergency discharges.

# When you need to apply for a permit

## 3.1 Routine discharges

SEPA considers that routine discharges to the water environment from the water treatment works are ‘activities liable to cause pollution’ and require to be permitted.

SEPA will therefore permit such discharges, which are normally associated with the clarification process of removal of suspended and colloidal matter, e.g. backwash water and reject water. The content of the discharge will depend on the treatment process described in the Understanding the activity section of this guidance. The most common discharges will be in service backwash water of filters and reject water. There should be no routine discharges of treated (chlorinated) water from a water treatment works.

SEPA’s preferred hierarchy for disposal of backwash water and reject water, dependent on content and volume, is to:

1. **Sewer**. (Scottish Water are responsible for authorising this)
2. **Soakaway**. An assessment of a discharge to a soakaway should be undertaken in accordance with WAT-G-068, EASR Guidance: Permit Activity: Hydrogeological guidance for discharges of effluent to a soakaway and WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment.
3. **Surface waters.**  Routine discharges from the water treatment works to surface waters should be assessed in accordance with WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment. The disposal route may depend on the treatment process. For example, membrane treatment produces a large volume waste stream which may be more beneficial to return to the watercourse.

## 3.2 Occasional discharges

You don’t normally need to apply for a permit for occasional discharges from the water treatment works and water supply systems which are undertaken in accordance with Scottish Water’s Water Hygiene Code of Practice or the Water (Scotland) Act 1980, as steps should have been taken to prevent pollution (e.g. removal of chlorine).

However, where we consider that the activity is liable to cause pollution, then you will need to apply for a permit. You will be expected to contact SEPA where you are considering undertaking an activity which may be liable to cause pollution.

### 3.2.1 Discharges arising from construction, maintenance etc

The Water (Scotland) Act 1980, Section 33 (1), allows a water authority,…. “who are carrying out or are about to carry out the construction, alteration, repair, cleaning or examination of any reservoir, well, borehole, line of pipes, or other work forming part of their undertaking” to discharge water into any available watercourse.

Examples of discharges that could fall into this category include the:

* **Operation of Raw Water Reservoir Scour Valves**. This is required periodically for safety checks and also to prevent build-up of silt. It may also be necessary to empty the reservoir to allow maintenance/refurbishment. The water may be heavily loaded with sediment and be at a different temperature to the receiving watercourse. Such activities should be controlled under conditions within the permit for the impoundment.
* **Granulated Activated Carbon Residues** **- Initial Backwash Waters.** This water will include fines from the commissioning of granulated activated carbon plant.
* **Service Reservoir / Clear Water Tank Cleaning.** Service reservoir and clear water tank cleaning can generate large volumes of water during draining which could result in a significantly increased flow in small streams, scouring of the bed and banks and high levels of suspended solids. The presence of chlorine in the final wash water after cleaning could also cause pollution.

The Water Authority must comply with the relevant subsections of Section 33 which defines the conditions under which a legal discharge may occur.

* s33 (3) - except in emergency and except insofar as may be otherwise agreed in writing….the water authority shall …
1. Give notice to any fishery district and SEPA (via Schedule 10(9) of NHS Act 1991) if the pipe is greater than 9”.
2. Have due regard to any representations.
* s 33(9) - the authority shall take all necessary steps to secure that any water discharged by them under the provisions of this section shall be as free as reasonably practical from mud and silt, from solid, polluting, offensive or injurious matter and from any matter prejudicial to fish or spawn or to spawning beds or food of fish.

Discharges which result from construction or maintenance work can therefore be adequately controlled via the conditions required in Section 33 of the Water (Scotland) Act 1980 and Scottish Water’s Water Hygiene Code of Practice. You only need to apply for a permit where the activity is liable to cause pollution, such as regular discharges to sensitive waters (e.g. low dilution, potential impact on protected area).

Any discharge made under this Section 33 should:

* Not cause pollution of the water environment.
* Have an outlet that is constructed and maintained to maximise the dispersion of effluent
* Not cause significant visible discolouration of the receiving waters.
* Not result in the destabilisation of the banks or bed of the receiving water or flooding.

If you are discharging from a service reservoir /clear water tank emptying, then a discharge to a watercourse should only be made where the chlorine content does not exceed 0.1 mg/l. Depending on the sensitivity of the surface water and dilution available, a lower chlorine residual may be required. Wash water containing sludges or chemical residues must not be discharged to a surface water and alternative measures must be taken to remove them from the site. You should notify SEPA in advance of making this discharge to agree a rate of discharge.

### 3.2.2 Occasional discharges from site operations

A permit is normally required for these discharges.

At small sites there may be occasional discharges, e.g. small discharge to land, over which no control is required to prevent pollution of the water environment. In such cases you will not need to apply for a permit.

Some examples of whether an application for a permit is required for occasional discharges is set out in below.

#### Safety Showers

Safety Showers must be provided at WTW sites. They will discharge during routine testing (approximately fortnightly) and following an incident when treated water and any chemical residues will be released. You should follow the discharge hierarchy:

* Discharge to public foul sewer
* Pass the flow to the effluent (backwash) line.
* Direct the flow onto land.

If you need to discharge to a surface water, you need to apply for a permit. Where the dilution is less than 500:1 then we will normally apply conditions:

* Requiring a flow limiting device.
* Restricting non-emergency discharges to a suitable time of day (for inspection).
* Restricting the duration of the discharge.
* Keeping of a maintenance record.

We may also require the provision and maintenance of neutralisation equipment.

#### Automatic monitors

Free chlorine monitors are used to monitor the free chlorine residual in the water supply line. These units may discharge up to 5 litres per minute. You should follow the discharge hierarchy:

* Discharge to public foul sewer
* Pass the flow to the effluent (backwash) line.
* Direct the flow onto land.

If you need to discharge to a watercourse you need to apply for a permit. Where the dilution is less than 500:1 then we will apply conditions:

* Requiring a flow limiting device.
* Keeping of a maintenance record.

We may also require the provision and maintenance of neutralisation equipment.

#### Emergency Discharges

Emergency overflows within the water supply system may operate in situations covered by the statutory defences defined under s33 of the Water (Scotland) Act. Conditions of s33, detailed in Discharges arising from construction, maintenance etc above.

Where the discharge is as a result of power failure, mechanical or electrical breakdown of plant you will need to consider the possibility of this in advance and apply for permit. You should take all reasonably practical measures to avoid uncontrolled discharges of treated water during plant breakdown. We will apply conditions:

* Requiring the water treatment process to be operated and maintained in accordance with best practice so that it remains fully operational, except at times of unavoidable mechanical or electrical breakdown.
* To notify SEPA of any breakdown which results in unauthorised discharges from the site.

## 3.3 Domestic water treatment systems

Domestic water treatment systems have backwash discharges which can contain potentially polluting substances. If the discharge enters a treatment system such as a septic tank, then no separate authorisation is required.

# Making an application

WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment, provides information on how to apply for a permit. You should try and avoid discharging water containing cationic polyelectrolytes because they are highly toxic to fish. Acute toxicity occurs at concentrations as low as 300 µg/l, lower than the practical chemical analytical detection limit of approximately 1 mg/l.

Anionic and non ionic polyacrylamide polyelectrolytes are significantly less toxic (in the range 50 to 100 mg/l) but approximately the same detection limit as cationic forms. Anionic and non ionic polyelectrolytes are therefore environmentally preferable in areas where water hardness and pH are low because polyelectrolyte activity will persist longer under such conditions.

Your application will be assessed and conditions on the relevant constituents of the discharges will be placed on your permit. We will normally set a suspended solids condition on your permit. WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment provides information on the standard we normally set. A more relaxed standard may be applied if there is no environmental/aesthetic need and there would be significant costs associated with meeting this condition. We may also need to add standards for iron and aluminium. The EQS for these substances is reactive or dissolved and we may need to set the permit condition as a different form of these metals. WAT-G-069, EASR Guidance: Permit Activity: The discharge of effluent to the water environment provides information on this.

You discharge may contain chlorine. This is highly toxic to fish and freshwater invertebrates. Serious environmental damage can be caused by discharges of chlorinated drinking water unless dechlorination is provided or a large dilution is available in the receiving water. Concentrations of total residual chlorine vary within the potable water distribution system. Indicative concentrations at treatment works range from 0.3-0.5 mg per litre, while a typical tap concentration is 0.1mg per litre free chlorine. The pH and temperature of the discharge affect the toxicity of chlorine. We may therefore set a chlorine standard and a temperature standard on your permit. The temperature standard may be omitted where dilution in the receiving water means this is not required. You can dechlorinate the discharge using sodium thiosulphate dosing. A wide range of dosing equipment and chlorine monitors are also available which you can use to control chlorine concentrations prior to discharge.

# Disclaimer

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