



Regulation of sewage discharge flow

Policy 385_07

Issued 29/07/09

Policy statement

We will set numeric discharge consent limits for the daily Dry Weather Flow of treated sewage that operators may discharge.

We will require operators to pass a specified minimum flow of sewage to full treatment before we allow a storm sewage spill. Where it is needed to protect the environment, we will require that a specified minimum volume of storm sewage is stored for return to full treatment before we allow a spill to the environment.



Document details



References

Objectives

- to control the environmental impact of treated sewage discharges;
- to include flow limits in all treated sewage discharge consents;
- to regulate discharges to address trends towards non-compliance, and record exceedance when we are confident it has occurred;
- firm but fair regulation, relying on the operator to monitor flow.



Feedback

Policy authorisation

Policy sponsor
John Fraser Head of Water Quality

Chair approval body
John Fraser Head of Water Quality

Contact for queries

Roger
Saxon

Details

Overview

To control the domestic and trade components of sewage effluent with the minimum effect from rainfall and infiltration, we will set discharge consent limits on the maximum daily Dry Weather Flow (DWF) that operators can discharge.

Requirement

We will require all operators discharging sewage that has consented numeric quality limits and a consented DWF of 50 cubic metres a day or higher, to measure and record the total daily discharge volume to an uncertainty of better than $\pm 8\%$.

We will require them to make regular returns of the data to us.

Discharge DWF

We will define the discharge DWF as:

‘the total daily flow value that is exceeded by 80% of the total daily flow values in any period of twelve months’

(hereafter referred to as ‘the 80%-exceeded flow’).

Monitoring compliance

In assessing compliance with the DWF limit, we will make allowance for the uncertainty in the estimation of DWF. We will only report a discharge as failing when we are at least 95% confident that the 80%-exceeded flow limit has been exceeded.

We will do this by calculating the total daily flow value that is exceeded by 90% of the measured total daily flow values in any period of 12 months and matching this value against the permitted maximum daily DWF limit. If this 90%-exceeded value is above the discharge consent limit, we can be confident that the discharge has truly exceeded the limit and will take appropriate enforcement action. We will expect operators to intervene earlier to plan for additional capacity to avoid unnecessary failure.

Storm sewage

We will only allow the discharge of storm sewage from treatment works under conditions of heavy rain or snow melt. To achieve this, we will require that the flow capacity of treatment systems is sufficient to treat all flows arising in dry weather and the increased flow from smaller rainfall events. Where needed to protect the environment, we will also normally require storage for the initial overflow of storm sewage arriving at the works.

We will allow a discharge of storm sewage when incoming flows exceed the required flow to full treatment and the required storm storage is full. We will set a required minimum flow to full treatment before a storm overflow is authorised. Where storm sewage storage is required, we will set a required minimum volume for the storage and require the operator to return the stored storm sewage to the inlet flow as soon as incoming flow conditions allow.

Setting flow limits

We want operators to maximise the volume of sewage they treat and minimise the discharge of storm sewage. Therefore, we will not limit the maximum sewage flow that they can direct to full treatment.

We will only set limits on the maximum daily flow or the maximum instantaneous flow of treated sewage discharges if the operator can appreciably vary these flows and control is necessary to limit the environmental impact, for instance, in tidal balancing schemes.

MCERTS

Where we require operators to measure flows, they must do so in accordance with our Monitoring Certification Scheme (MCERTS) requirements (www.mcerts.net), and provide flow data to our specification.

Recording compliance

We will normally report compliance against DWF limits each year.

When we record that the 90%-exceeded measured flow exceeds the DWF limit, we will require a technical report from the operator on the reasons and, where necessary, the proposed solution. We will then require the operator to take any appropriate action to restore compliance. We will only record a failure to comply with the consent if the operator fails to report or fails to take the appropriate action.

Background

Introduction

The environmental impact of a discharge to water depends on the load of pollutants discharged. Measurement of the daily discharge flow of treated sewage discharges above 50 m³/d was started during the water companies' asset management plan 2000-2005 (AMP3) investment programme. This policy states this continuing requirement.

Dry Weather Flow (DWF)

Discharge consents for treated sewage discharges have for many years included a limit on the maximum Dry Weather Flow (DWF) allowed.

When setting the consent, the DWF limit in recent years has normally been determined by the formula:

PL+I+E

Where **P** = population; **L** = daily per capita sewage flow; **I** = dry weather infiltration and **E** = trade effluent flow.

The water companies estimated the factors in this DWF calculation formula, but since they were usually unsupported by any measurement, we could not verify the data.

Monitoring compliance

The traditional compliance definition of DWF is:

‘the mean flow over seven dry days after seven days when rainfall did not exceed 0.25 mm on any one day’.

However, when we used it for the first time with measured flow data, it proved to be an unsuitable regulatory parameter for both the operators and us.

The main reasons are that successive estimates are extremely variable and failures are unpredictable, uncontrollable and not linked to any increased environmental impact. Because the DWF calculated by this method is unrelated to the DWF limit set in the consent, it does not monitor compliance with the consent limits.

Research into DWF parameter

A research project sponsored by UK Water Industry Research Ltd (UKWIR) recommended that the annual 80%-exceeded daily flow was the best definition for the regulatory DWF parameter. It provides the most stable flow measure that overcomes all the problems with the traditional definition of DWF compliance.

When both were averaged over several years and many discharges, it was also close to the DWF value determined by the traditional compliance definition.

Conclusion

This means that we are able to move with reasonable confidence of not creating significantly more stringent or lax consents to the new definition without changing the numeric DWF limit values in the discharge consents.

We will continue to use the formula PL+I+E as the theoretical basis for the DWF and we will use the 80%-exceeded flow to calculate the dry weather infiltration.

We will assess compliance with the DWF limit using the 90%-exceeded measured flow because the 90%-exceeded flow approximates to the lower bound of the 90% confidence interval around the 80%-exceeded flow. Therefore, if the measured 90%-exceeded value exceeds the DWF limit, we are at least 95% confident that the limit has truly been exceeded.

MCERTS

The MCERTS scheme requires operators to measure the total daily flow to an uncertainty of better than $\pm 8\%$ with 95% confidence. Because the accuracy of flow measurement is significantly affected by installation factors, the MCERTS scheme requires operators to employ a certified MCERTS inspector to examine their flow measurement system and their quality management system for maintenance of the system. If these are satisfactory, the operator will be given a MCERTS conformance certificate. This certificate has a life of five years, after which the operator must have the system re-certified.

Storm sewage We allow the discharge of storm sewage from treatment works under conditions of heavy rain or snow melt to prevent treatment being overloaded. The normal permitted overflow setting is calculated from the formula $3PL + I + 3E$, where the factors have the same value as in paragraph 2 above, **except** for infiltration, I.

The infiltration factor used here is that applied during dry weather, but when the ground is saturated and infiltration is high, usually during late winter. We use a higher value to ensure that infiltration does not cause the storm overflow to operate in dry weather.

Storing spilled storm sewage

Storage of spilled storm sewage reduces the frequency and total volume of storm sewage spilled to the environment. We allow a discharge of storm sewage when incoming flows exceed the required flow to full treatment and the required storm storage is full.

The operator must always return the stored storm sewage to the inlet flow for treatment as soon as incoming flow conditions allow, so that the storage is available for the next storm event.

Setting flow limits

Historically, many treated sewage discharge consents have included limits on the maximum flow that can be discharged. In practice, operators can only comply with such limits by limiting the peak flows to treatment and discharging more sewage untreated through the storm overflow. We want operators to maximise the sewage they treat and minimise the discharge of storm sewage.

Therefore, we will not limit the maximum sewage flow that they can direct to full treatment. We will only set limits to control the maximum discharge flow rate if the operator can store sewage for part of the time, for instance, in tidal balancing schemes to limit the environmental impact during discharge.

CFD charges

The change in the definition of DWF will not affect the annual CFD charges that operators pay. Charges will only change if the numeric flow limit in the discharge consent is changed because the discharge has become larger or smaller and the change takes the discharge into a higher or lower flow band.

Desired outcomes

- we have a single clear definition of DWF based on measured flow data
 - discharge consents for treated sewage discharges contain an appropriate maximum DWF limit that together with the quality limits control the pollutant load that can be discharged;
 - compliance with the limit is assessed by a simple and consistent method that is linked to the impact of the discharges
 - we do not include inappropriate flow limits in discharge consents that cause environmental deterioration
-

Audience

- **internal:** WQ Permitting Officers, WQ Planning Officers, Area Environment Officers, Strategic, Technical Services, Regional Data teams and EP Policy teams
 - **external:** Operators, Department for Environment, Food and Rural Affairs (Defra), Welsh Assembly Government (WAG), Water Services Regulation Authority (Ofwat), non-Governmental organisations (NGOs), Water UK
-

Legal provisions

- The Water Resources Act 1991 (as amended by the Environment Act 1995) Schedule 10, paragraphs 3(4) (e) to (g) provide for conditions in consents requiring the installation, maintenance and testing of meters to measure and record the volume and rate of discharges. They also allow us to require the consent holder to keep records and make returns.
 - The Urban Waste Water Treatment Regulations 1994 Regulation 11(1) requires us to monitor (or procure the monitoring by a competent authority or appropriate body) discharges from urban waste water treatment plants. We monitor to verify compliance with the relevant requirements of Part I of Schedule 3 in accordance with the control procedures set out in Part II of that Schedule.
-

Policy implementation plan

Who are the target audiences?

internal: WQ Regulatory Officers, WQ Planning Officers, Area Environment Officers, Strategic, Process Management, Regional Data teams and EP Policy teams.

external: Sewerage undertakers, Defra, Welsh Assembly Government (WAG), Ofwat, non-Governmental organisations (NGOs), Water UK.

Do they require awareness training or education?

internal: Awareness through cascade/NOG briefing/ Operational Instruction

external: Direct consultation with sewerage undertakers, Defra, WAG and Ofwat.

What do they need to know?

Understanding of new DWF definition, compliance assessment and how it will be implemented.

When do they need to know it?

As soon as possible.

How will they be told?

Internal bulletin and direct consultation with external audience.

Who will tell them?

Internal by Surface Water Process team, external by consultation.

Monitoring of progress

Methods

Sewerage undertakers informed of policy change in definition of DWF.
Monitoring issue of general modification notices to all sewerage undertakers.

Success criteria	Date completed
All undertakers have received notices.	by 31 October 2009

Comments

None.
