

Ed Bramley

Environmental Regulation Manager, Yorkshire Water,
Western House, Halifax Road, Bradford, West Yorkshire, BD6 2LZ

☎: 01274 804 095

✉: ed.bramley@yorkshirewater.co.uk

Background

Since 2009, there has been increased public awareness of the operation of Combined Sewer Overflows (CSOs), particularly in relation to high sensitivity locations, such as bathing beaches. This awareness has been heightened by a number of effective media campaigns by groups such as Surfers Against Sewage and the Marine Conservation Society, with articles in the Sunday Times and a BBC Panorama programme. Such campaigns were initially focussed on the acceptability of overflows in such locations, but subsequently on the ability of the sector to understand and manage its assets effectively. At the same time, an infraction proceeding was brought against the UK by the EU, relating to the performance of sewer overflows under the UWWTD. All have brought pressures on companies to make CSO performance information available.

Increasing public awareness

It was in 2009 that the Marine Conservation Society started to increase public awareness of the location and operation of CSOs with their 'Raise a stink' campaign, which they ran in conjunction with the Sunday Times. The focus of their campaign was to understand the degree to which CSOs were the cause of water quality problems at bathing beaches, and what could be done about it. As part of their campaign, they used Freedom of Information requests to seek out information on how frequently overflows were operating. One of their conclusions was that "monitoring data is not shared by the water industry with the statutory agencies on a systematic basis" and, because of this, "it was not known the degree to which CSOs are causing bathing water pollution." Similar campaigns by other pressure groups, including Surfers Against Sewage and Fish Legal only emphasised these findings.

Further media pressure followed with the BBC Panorama programme on 7th September 2009, with their headline – Britain's Dirty Beaches. This programme initially focussed on whether CSOs were acceptable at high sensitivity sites, but realistically became a question over whether the performance of CSOs was understood and being effectively managed by the sector.

At the same time, regulatory and legal questions, particularly in relation to an infraction case brought by the EU against the UK, meant that CSOs and their performance remained high on the political agenda. In this case, which initially involved four locations, centred on the EU's reasoned opinion that the UK was not complying with the requirements of the Urban Waste Water Treatment Directive. Specifically, that storm water outfalls should only discharge in response to unusually heavy rainfall.

With the requirement from 2012 under the revised Bathing Water Directive for the competent authorities to be carrying out beach management, this has produced another twist in the question of CSO monitoring. Whilst event duration monitoring

(EDM) information is generally available some time after the actual event, to allow for quality control of the information, monitoring for beach management requires that information to be available in near real-time. Again, pressure came from third parties to provide alert information available during the current bathing season. In response, a number of companies set up systems accordingly and more water companies will be doing so next year.

In response to these pressures, the government in October last year set up the Cleaner Seas Forum, chaired by Richard Benyon MP. This is a forum involving the water industry, environmental NGOs, tourism and other stakeholders with an interest in water quality and public health. One of the aims of the group is to consider how the public can be alerted to CSO discharges.

Further ministerial involvement from Richard Benyon came in December last year, when responding to a question on how much is discharged from CSOs, he replied – “While some site specific information on the amounts discharged may be available on public registers it is not collated for all sites. However I strongly encourage water companies to make information on CSO spills available to all, where technically possible.”

Response of the sector

Initially, the sector was slow to respond to these challenges, partly as a result of lack of reliable information, but also because there were understandable sensitivities about releasing performance information into the public domain.

This was partly, as will be seen from the section below, because there were a number of technical questions in relation to spill monitoring that had not been resolved. In turn, this produced a lack of confidence in the reliability of such data, when used for something other than its original purpose. Beyond this, companies had not been analysing and using such data routinely, so it was unclear what such datasets would highlight in terms of performance of the sewerage networks.

Companies did however manage to collate what data was available on CSO performance, and there is generally around 30% of overflows in the UK that can be said to have some form of monitoring available, although a significant proportion is in the form of surrogate information. This varies according to company, and within any company, geographical coverage is unlikely to be uniform, with most monitors capturing information for the highest sensitivity locations.

Event Duration Monitoring

Many of the information requests received were for volumes of storm sewage discharged, whereas most companies have event duration monitoring at best on overflows. In this respect, the principle monitoring device that most companies have in their sewers is for alarming when there is a potential blockage, such as the hawkkey system. Use has been made of these systems to provide a suitable surrogate for true EDM, but it necessarily brings with it a number of caveats, and this was one of the reasons for sensitivities in releasing information.

Those caveats include:

- The hawkeye system works by 'voting' between a set of overflows, to detect whether one is operating abnormally. This is therefore a fundamentally different use of the equipment to that which was originally intended.
- When checking for blockages, the prime focus is not on accurately detecting a spill, and hence there is no guarantee that the device is zeroed to the spill level of the overflow.
- As these devices are working as a group to detect blockages, they can be sited at places where they are not representative of spills to watercourses e.g. monitor on the sewer side of a storage tank, rather than on the outfall side.

Other technical and organisational problems to be overcome include:

- CSO location and status information not up to date
- Monitor tag does not allow the recorded data to be tied back to a specific site
- Monitor 'hunting', where there is a high frequency oscillation of the sensor between its on and off state, giving the false impression of a very large number of spills
- Lack of software to efficiently analyse event duration information.

There were also questions of how to interpret data, particularly in relation to spill counting. Two questions were particularly pertinent:

- Is there a minimum duration of spill that should be counted as a spill?
- Are all individual spills counted, or are individual discharges over a time period amalgamated?

Standards for monitoring

In response to the technical questions raised above, the industry, in consultation with the Agency, is actively working to resolve them, which will culminate in a technical standard for CSO event duration monitoring.

The technical standard will consider the monitoring chain from end to end, from sensor, to data storage, and onward routine transfer to the Agency. Already, a tool has been produced by the Agency, which all companies are now using, for carrying out analysis of raw spill data to produce aggregated daily spill counts. Tests have also been carried out in one region to check that data transfer to the Agency and subsequent storage is happening correctly and consistently.

With additional work on alignment of asset records between companies and the Agency, it is now becoming possible to routinely enquire on the performance of any overflow, where this is required in its permit. Last year for example, around 760 records existed for priority sites, and over 90% of those were shown to have discharged 10 times or less in the year.

There are still some technical challenges to be resolved, such as the question of hunting, and a standardised approach for what should be classed as a spill, but there has been a significant advancement of the technical knowledge and capability of the industry in this area, even over the past year.

Real-time monitoring

With the introduction of the revised bathing Water Directive, from next year there will be increased requirements to provide information for key locations in near real-time, as part of the beach management process. As a precursor to this, several companies are already starting to provide such a service, with more setting out to do so next year.

An example of this is the work carried out by South West Water, who have the largest number of beaches in the UK. From June this year, they have been providing a web service (Beach Live), which gives live updates on any risks from overflows in the public sewerage network at 17 of the region's most popular and Blue Flag beaches. This service is updated on a rolling 15-minute basis and advisory warning emails are sent to beach managers when significant overflows occur. This information is then also picked up by third parties, such as Surfers Against Sewage, who are providing beach specific texting services on water quality.

The near real-time beach management services often require dedicated manpower for the quality control of information, and there are still significant issues with the reporting of false positives. However, it is likely in the foreseeable future, as the technical issues are resolved it will then be possible to release a greater quantity of reliable information sooner.

Beyond this, looking at beach management as a whole progresses, then there is ultimately likely to be a combination of monitoring and modelling, to predict and warn of possible instances of poor beach quality before they occur. In all of this, all parties are aware of the need to issue reliable warning messages to the public, which are then acted upon proportionately, particularly as this could otherwise affect the livelihood of others.

Monitoring as an integral part of asset management

Whilst it would be easy to focus on CSO monitoring as the end point, the analysis of monitoring data then starts to raise further questions. Considering the data spatially, some overflows can be seen to operate more frequently than others. To explain why, one needs to turn to other sources of information, including modelling, and even here, the information is not always in a form that is readily comparable.

With the right modelling outputs, this information can be used in conjunction with asset and monitoring data, to create an asset management cycle. The modelling data provides an expected bandwidth of overflow performance, which can then be monitored against on an ongoing basis. Any divergence outside of the expected range of performance would then be investigated. Where the system is found to be deficient, then the appropriate operational or capital action can then be taken.

Given that the sector is moving from a position of having addressed the majority of legacy issues, to operating and maintaining networks on an ongoing basis, then such an approach would provide the correct focus of activities. In addition, it would have the benefit that such a focus was visible to the wider public.

The changing face of regulation

To date, overflows are paradoxically consented for what remains within the sewer, but it is what is discharged from the overflow that impacts on the environment. Given the developments in monitoring, plus approaches such as those defined above, it is likely that CSO permits in the future will have monitoring clauses similar to those for DWF at sewage treatment works. Those STW permits require the DWF to be monitored, and if it falls outside of an acceptable range, to then investigate and, if necessary, take action accordingly.

Such an approach would not only enable overflows that are deteriorating with time to be identified and acted upon in a timely manner, but would also help with such questions such as whether original modelling or civil engineering was fit for purpose. It has particularly been these types of question that have provided the greatest regulatory challenges to date. In addition, a monitoring and action approach would also help in providing an objective structured case for future capital investment to the economic regulator, OFWAT.

Summary

In the past few years, public awareness of CSO discharges has increased significantly, and has led to an increased requirement for their performance to be visible.

In response, the industry is solving at how to make this happen reliably, and to understand the implications of what is being monitored. With the next set of AMP programmes under development, CSO monitoring is likely to feature significantly.

The challenge, and the opportunity, for the future is to make the performance of these CSO assets more visible, and to contextualise their performance. The goal is to provide confidence to the public, as well as the environmental and financial regulators that the performance of sewer overflows is both understood and is being well managed on an on-going basis.