Discussion: Improved compliance with the Reservoirs Act 1975 in England

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Introduction

As Chair of the Editorial Panel for this journal, I read with interest the above paper (King, 2016). The *Dams and Reservoirs* circulation list exceeds 120 countries and it felt appropriate to offer a little more history and context to the above paper. Between 2003 and 2010, the discussor established and led this valuable role for the Environment Agency (EA) and remains a strong advocate.

The impact that a single, well-funded enforcement authority has had in enforcing the Reservoirs Act 1975 (HMSO, 1975) for England and until recently for Wales as well is significant (King, 2016) and the achievements in securing an increased level of compliance to be applauded. While appreciable inroads to reducing non-compliance have been made by the EA, the complete picture for risk reduction in the twenty-first century at least is explained by the behaviour and dynamics of the other two main parties responsible for the management of reservoir safety, namely ‘undertakers’ and panel engineers. As our reservoirs increase in age this tripartite relationship is essential in maintaining the enviable record of reservoir safety since the two tragic dam failures in 1925 and subsequent introduction of the Reservoirs (Safety Provisions) Act in 1930.

Establishing the role

Prior to October 2014, 136 local authorities (LAs) were responsible for enforcing the Act. Behind the need for the change to the Act heralded by the Water Act 2003 was the acknowledgement by the government that many LAs did not enforce the Act. Indeed, when initially approached by the EA in 2003, at least two LAs denied that they even had the role and certainly many others did not maintain adequate records.

A Project Board comprising internal and external stakeholders was established in 2003 to oversee the transition of the enforcement role from the LAs and crucially support the comprehensive communication strategy required with key stakeholders (Hope, 2006). Early analysis has shown a very diverse group of undertakers, 75% of whom only owned one reservoir. As a stakeholder base this has always proved difficult to engage with, there being no single trade body for example.

The role of the regulator

The regulatory role for the Act in Great Britain is relatively light-touch. The Act is structured significantly differently to any other reservoir safety regulatory regime in Europe or indeed elsewhere in the world. The Act relies to a greater degree on both inspecting and supervising engineers – that is panel engineers, to both establish safe operating regimes and crucially, consequently report on the compliance of the undertaker with this regime. The EA’s prime role is to ensure that panel engineers are appointed and essential safety works (prescribed by the inspecting engineer, IE’s) are implemented in a timely manner.

To draw an international comparison, a comparable number of reservoirs (2700 in number) are regulated by the Federal Energy Regulatory Commission (FERC) in the USA. They directly employ more than 140 engineers engaged in drafting and enforcing engineering standards, attending inspections and specifying operating regimes. FERC issues safety directions to owners and consents. They also appraise and approve or reject the annual safety reports submitted by the owners.

In Britain, the IE is reliant on a well-researched body of guidance when conducting his inspection as opposed to specific engineering standards. While the EA is responsible for funding future guidance, technical input comes from contractors/consultants, overseen by steering groups comprising reservoir industry representatives.

A comparison of differing regimes is reflected in Figure 4.

In European Regulatory Frameworks, the regulator: ‘gives advice, supervises, issues standards and attends inspections’.

Dynamics

Prior to 2004 undertakers rarely received communications from the regulator. The IE and to some extent, the SE fulfilled this surrogate role. The establishment of an active enforcement authority had a major impact on all parties.

A balanced relationship (undertaker, panel engineers and enforcement authority) is best explained by the analogy of a

Figure 4. Reservoirs Act 1975 – comparison of regulatory frameworks (Hope, 2006)

three-legged stool. The three-legged stool analogy is explained in Figure 5 (Hope, 2006).

Clearly, there will always be a common ground as well as an arena of healthy tension. However, prior to 2004 for many reservoirs there was no enforcement leading to a lack of engineering supervision with essential safety works left unaddressed, a complete imbalance, essentially at least one leg was missing!

Accurate records

The quality of records held by the 136 LAs was extremely variable and even in a few cases non-existent. Comprehensive accurate records were seen as paramount and between 2004 and 2008 several projects and initiatives delivered improved data and exposed previously unregistered reservoirs. (Goff and Hope 2008). The EA was reliant on the judgement of inspecting engineers visiting the reservoir site when disputes occurred where existing reservoirs were newly 'discovered'.

Reservoir enforcement and surveillance system (RESS)

The backbone for establishing a consistent process for recording appointments and reminding/prompting compliance was a

software program and record depository, RESS. Algorithms were developed from the flowcharts illustrated in the ICE Guide to the Reservoirs Act 1975 first published in 2000. The system despatched letters and emails proactively, effectively fulfilling a role analogous to a highway speed camera. For example, 28 days before an appointment was due a letter enquired of the undertaker who he/she had appointed. These prompts and subsequent acknowledgements ensured that many potentially recalcitrant undertakers took steps to avoid non-compliance – they knew that there was a speed camera ahead and that they were being monitored!

Enforcement panel

Confronted with a range of non-compliance, the principles of 'Modern Regulation' were applied to prioritise our actions and focus on the greatest risk(s). These principles were set out following the Hampton Review by the Better Regulation Task Force (now known as the Better Regulation Executive). The principles aspired to: transparency, accountability, proportionality, consistency and targeted actions set out help change the behaviour of the regulated community, in this case non-compliant undertakers.

Consistent decision making was established through a monthly enforcement panel, monitoring individual cases towards resolution of non-compliance. A critical ingredient was legal advice provided by an in-house lawyer, experienced in securing prosecutions. Internal tensions arose periodically when what was regarded as 'national decisions' to enforce non-compliance were seen by local area managers as impacting on their geographic area of operational responsibility.

Risk-based approach to addressing measures in the interests of safety (MIOs)

Early analysis of MIOs showed that some were actually unenforceable and some were open ended with no defined completion date. An early opportunity to address these anomalies was the Biennial Inspecting Engineers' Forum in November 2005 which is traditionally held in-camera. Examples were

Figure 5. Three-legged stool analogy

quoted, together with the promotion of a proposed, risk-based, scaled approach, suggesting that MIOs for a category 'A' reservoir should be completed within 3 years through to those for a category 'D' in 5 years in the absence of specified timescales. This approach was subsequently adopted by the EA for addressing the significant backlog of non-compliance of MIOs.

Prosecution

Following persistent non-compliance of an undertaker responsible for two reservoirs in Wales, in 2008 the EA took and succeeded in its first prosecution. Prosecutions under the Act are very rare. The resounding message to non-compliant undertakers was that the EA, if after failing to persuade, would use its enforcement powers to the extreme.

Recalcitrant undertakers finally realised that the Act had teeth and EA meant business! The prosecution also provided a clear message of support to panel engineers. However, a constant issue reported back from supervising engineers in particular was the reluctance of undertakers to address routine maintenance tasks.

Biennial reports

The publication of the Biennial Report on compliance of the Act was an opportunity to influence behaviour of the regulated community effectively by naming and shaming non-compliant reservoir undertakers. It was also seen by Barbara Young, EA Chief Executive (2000–2008) as an opportunity to influence government. Early experience in the enforcement of the Act soon developed a shopping list for the desired change. The opportunity was seized to incorporate this desire and the first headlines for change were summarised in the 2005 Biennial Report. By virtue of the fact that the report was in the public forum the regulated community were concurrently being consulted on future planned changes to the Act.

The Pitt report

When Sir Michael Pitt was appointed by government to review the impact of the 2007 floods and recommend change, for reservoir safety, he was directed to the Biennial report in part as evidence for change. Dr Andy Hughes and I took him to Venford Reservoir to expand on our evidence for change and show him around a typical construction site where spillway improvements were underway (Figure 6).

During the summer floods of 2007, the emergency response at Ulley was reliant on a hand-drawn inundation map. Major undertakers had been very reluctant to have outline maps published believing that they may be held responsible for potential 'property blight' in the downstream shadow of the dam highlighted by the inundation map. This same, limiting argument was usefully voiced by the undertaker when we visited Venford

Figure 6. Sir Michael Pitt (centre) at Venford hearing evidence from Dr Andy Hughes, Atkins and the author

Reservoir in South Devon. Pitt had no hesitation in seeing the overwhelming benefits in an open approach by publishing outline flood maps. This was the first step towards ensuring improved preparedness of downstream populations, which number some 1.2 million people in England alone.

Flood and Water Management Act (F&WMA) 2010

Post review (Pitt, 2008) a completely new Act was drafted. Drafting was a convoluted affair, with a Defra lawyer briefing a parliamentary draftsman. Draft copies would transfer by way of Defra officials to the EA. Quite why the practitioners for enforcement with a working knowledge of reservoirs could not sit around the table of legal experts was unfathomable. It certainly leads to a lot of iterations and needless delays. However, time was against the then Labour government and it was quickly decided to amend the existing act through the instrument of the F&WMA 2010 (HMSO, 2010).

The UK comprises four devolved countries and the F&WMA only applies to England and Wales. The pace of change between these two countries differs and Defra for England is still 'seeking evidence' to start the regulation of small raised reservoirs (SRRs) – that is those between 10 and 25 000 m³ in capacity. The British Dam Society has previously submitted evidence to Defra to support the regulation of SRRs and continues to press for this logical change to improve the safety of those living in their shadow.

Curiously, other gaps still remain. The Water Act 2003 also introduced the requirement for emergency action plans. While most leading undertakers have adopted this process and actively engage with the 'blue light services' this has yet to become a legal requirement. Arguably, those recalcitrant undertakers disproportionately concerned with the bottom line are the ones with higher hazard, ageing/deteriorating structures. Once again the EA will need to exert further 'persuasion' to put this logical contingency in place.

Conclusion

The EA has successfully asserted the enforcement role. Through establishing a consistent approach to regulation and enforcement, and engaging with the two other pivotal parties namely panel engineers and reservoir undertakers a safer regime has been established.

Contribution by A. K. Hughes

As Chairman of BDS I too found the article interesting but also of concern.

I was instrumental in bringing the enforcement role to the EA after suggesting to the government in the 1990s that the enforcement role was not working – and we got the required changes in the Water Act 2003, the adoption of a single Enforcement Authority.

I also assisted Ian Hope as he set up the enforcement team in Exeter, and as you can see above I gave evidence to Sir Michael Pitt.

I therefore find it disappointing that we have not achieved what I hoped we would have achieved, and in some areas due to budget cuts and an apparent lack of interest from the government we have gone backwards!

If one looks at the development of our legislation we always seem to react to situations but in the case of the F&WMA, 2010, although it was a reaction to the 2007 floods Ian and I had been assembling a list of changes to the legislation that we wanted to achieve if ever the opportunity arose.

We tend to be given an opportunity every 30–40 years and I believe we have missed a significant opportunity with the F&WMA, 2010.

I find it disappointing that

- We essentially will have four different forms of legislation – Ireland, Scotland, Wales and England even though England and Wales have the same legislation! BDS continues to try to convince Defra that the 10 000 m³

capacity limit should be starting in England. The Welsh Government has already stated that they intend to adopt the 10 000 m³ limit as will Ireland and Scotland – so why does not England do the same?

- Cascades – we all know of cascades of reservoirs where the domino effect could cause loss of life and damage to infrastructure – so why is this element of the legislation not being adopted?

In both of these cases if only one life was saved would it not be worth the effort?

- I am disappointed with the categorisation process – it has taken far too long, in many cases the decision has been based at least in part on the Reservoir Inundation Maps (RIM) which have been acknowledged by most as being not appropriate for 'classification'.
- I also feel that the classification system in England which means a reservoir is either in or out of the legislation in simple terms has led to far too many reservoirs being classified as high risk and I also feel that it has been a total waste of public money in that it was decided that an inspecting engineer carrying out an inspection could not assist the EA with the classification process and another AR engineer, from the firm who did some of the RIM mapping, had to be despatched to visit the same site at significant cost to the public purse to make the decision.

You will have noticed that BDS is publishing information that Natural Resources Wales is producing in order that our membership is informed about the legislative change, timescales and so on.

- I find it very disappointing that our various regulators are no longer providing the bulletins and fact sheets that we used to get on incidents and accidents, legislative change, published statutory Instruments and so on. If no one else is going to do it then BDS will have to take on this role for the benefit of our membership.

BDS by way of RSAG will also continue to campaign against the decision by Defra/EA that they will only finance research projects – not replacement of many of our guidance documents which need updating or even new guidance documents that we might need. Apparently, my argument that we should finance and produce what the profession needs does not hold water!!

As Ian stated improvements come from us all working together – the enforcement team, the panel engineers, the owners – and of course BDS! Watch this space!!

Author's reply

T. Deakin on behalf of the EA

First, I would like to thank Ian Hope for his comments, acknowledge his role in setting up the enforcement authority and say that we continue to build on and develop our enforcement authority role in response to changing times.

Dr A. K. Hughes raises a number of points relating to the EA.

We recognise the need for improved risk mapping and the EA has funded a project which has already delivered a new flood mapping specification, and which will be used when we start to update our maps later this year.

It will be useful to review how the different devolved approaches to classification perform in the future so that we can consider any changes which secure public safety while minimising regulatory costs for owners.

We continue to publish an annual incident report providing information and lessons learned for incidents reported to us. We also publish our biennial report to government every two years showing the steps we have taken to ensure compliance with the Act and update panel engineers and undertakers on the work we are doing. Incident bulletins will be published for any incident where information needs to be shared with the industry promptly and we are happy for a panel engineer involved in an incident to make us aware if they feel that the situation warrants a bulletin to the industry. We communicate with all panel engineers and undertakers with updates as required, such as when we publish a document or there are important changes that we need to make them aware of. We also recognise that a shared approach to advice and information provision fits with the challenge of working better in partnership moving forward and are happy to discuss such opportunities with the BDS.

The reports referred to above can be found in the following: Biennial Report 2013/14 (BR, 2014)

■ Post Incident Report 2015 (PIR, 2015)

We have been working hard with RSAG members to identify appropriate funding routes so that the needs of the reservoir community are met. Below are some examples of work we have recently delivered:

- Guidance on reservoir conduits (including tunnels, culverts and pipes) – Joint funded (50%) with Ciria (Ciria, 2016)
- Investigating the structural safety of cracked concrete dams – Joint funded (75%) with the International Dam Safety Interest Group (IDSIG, 2017)

- Guide to Drawdown Capacity for Reservoir Safety and Emergency Planning – Funding contributions (up to £10 K) from Water Utility Companies. Publication March 2017.

In summary, while we may not always agree on all things all the time, the healthy tension that exists between the various parties in the reservoir community has helped deliver a public safety record – that is exactly what the public would expect. We can be proud of that, but need to keep testing our thinking to keep ahead of emerging risks.

Defra, Flood management team

Thank you to Ian Hope and Dr A. K. Hughes for their comments. I would like to respond to their concerns about Defra's intentions concerning the regulation of reservoirs <25 000 m³, and in particular the implementation of the remaining reservoir safety provisions contained in the F&WMA 2010.

We recognise the concern around the safety of unregulated reservoirs. When we looked to implement Phase 2 of the FWMA, we found that we did not have sufficiently detailed information on the number, ownership or risks posed by smaller reservoirs. We therefore did not have the necessary evidence to support extending regulation to target smaller reservoirs between 10 000 and 25 000 m³.

We are now looking to address these gaps in our knowledge, and have recently published an invitation to tender on a research project to gather evidence about reservoirs with a capacity between 10 000 and 25 000 m³, the level of risk they pose and their location. This information will be essential to inform a decision on whether to regulate smaller reservoirs. It will also help us to ensure that any regulations target those smaller reservoirs posing an unacceptable risk to life, while avoiding imposing unjustified new costs on thousands of smaller reservoirs that do not pose a problem.

This project forms part of the Joint Research and Development Programme undertaken by Defra, EA, Welsh Government and by Natural Resources Wales. The project has been developed with input from the Joint Programme's external Theme Advisory Groups and the Reservoir Safety Advisory Group.

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