Pursglove, Dan

From: Nicholas, Michael
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To: Humphreys, Clive
Cc: Raymond, Sarah; Pursglove, Dan; Nicholls, Kathy; Doran, Noel
Subject: CIRIA C736 - intent and application

Follow Up Flag: Follow up
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Dear Clive / all,

We discussed that I led the Environment Agency work associated with the development of CIRIA c736. I secured the majority of funding for the revision work, co-ordinating our input with the other G.B. environment and safety regulators and input technical expertise regarding containment systems for pollution prevention.

I am willing to provide a statement covering my role and expertise in more detail – this developed over 23 years of regulation of industry, including national leadership continually improving the measures for the mitigation of Major Accidents to the Environment and extensively embedding environmental protection expectations into industry codes, standards and guidance. I could also describe in more depth the intent and approach in the CIRA c736 guidance, clarifying the terminology (e.g. primary, secondary, and tertiary containment, inventory and containment systems) with specific cross referencing.

Due to the need for urgent advice I currently summarise the matters below.

- Over several decades, emerging from the 1970s, industrial codes and standards evolved, driven by the occurrence of incidents involving loss of containment of polluting substances and resulting in significant impacts to the environment – hazardous liquids pollution land and water.
- A consistent minimum requirement for mitigatory containment, focusing on local secondary containment bunds, emerged by the 1990s, which was based on experience of industry and regulators – This was characterised and codified in the 110% / 25% rule. This rule is introduced in more detail in the precursor document to CIRIA c736 (i.e. CIRIA R164, 1997) and several other codes and guidance, including Environment Agency “Pollution Prevention Guidelines”.
- The 110%/25% rule has also featured in various guidance on selection of the measures expected to be adopted by operators who apply for an environmental permit and compliance under other regulatory regimes (e.g. Health and Safety at Work Act and underlying regulations).
- The environmental regulators have observed a gradual reduction in scale of impacts associated with those businesses we regulate. Where secondary containment is in place and maintained, to the recognised standards (notably the 110%/25% capacity requirement), the impacts to land and water from industrial accidents and incidents are generally significantly reduced. Conversely, those incidents that cause serious or significant harm to the environment are associated with sites which do not follow recognised good practice (e.g. those that have not introduced the 110%/25% rule or better for containment capacity).

In the following bullets I explain the need for CIRIA c736 and more stringent, more robust containment systems and the approaches it contains.

- Even though there was a general downward trend in industrial incident frequency, there remained a significant number of events where operators were found to have implemented inadequate containment to keep full inventory of polluting materials under control and contained within their sites. The aim of CIRIA c736 was to build on previous guidance, to emphasize that secondary containment built to good practice may not alone be sufficient for some scenarios. It outlines additional site-wide measures and enhancement measures for containment (primary, secondary and

tertiary containment) that may be required to reach an acceptable level of risk reduction (acceptability is judged in accordance with regime specific guidance).

- The c736 guidance adopts two separate risk-based calculation approaches:
    1. As an alternative to the 110%/25% rule, section 4.2.1 introduces a calculation method for required containment capacity based on maximum inventory of substance(s) within a containment area (a bund or an larger area of a site or the whole site) and then requires additional capacity for additional factors which could mean extra containment volume is required - for example containment of additional rainwater, additional firewater or freeboard for containment and stabilisation of firefighting foam or a foam blanket. This more bespoke method requires a more detailed assessment of site-specific factors and can be applied both to calculate the required capacity of an individual bund (individual secondary containment volume) or more widely across groups of tanks or to the whole site, where there is potential for the whole site to be involved in an escalated incident (as may occur at sites where an explosion is credible for example)
    2. A risk-based categorisation is introduced in section 4.3, for calculating site-wide containment capacity. This includes guidance on factors including the hazards of the total inventory on site, the location of the site, the probability or possibility of any incidents and potential consequences. The approach is framed in terms of accident scenarios that may occur at a given site and results in an overall site risk and a recommended "Class" of containment. Class 1 being closely aligned to minimum historic regulatory benchmarks and class 2 and class 3 providing additional measures which may be required to control risks to an acceptable level for sites which are not low risk. This approach is used to guide the measure required for containment across the whole site and can indicate the need for additional measures to be adopted in addition to good practice bund design, as well as indicating need for enhanced site-wide containment (e.g. tertiary containment systems involving catchment areas outside of bunds, drainage design and tertiary containment measures such as remote containment and lagoons.)
- Table 6.2 clearly summarises the intent of the guidance. It can be seen from table 6.2 that:
    a. The class-based system leads operators to consider additional design issues for higher levels of risk (i.e. class 2 or 3 containment systems need to be more robust with better performance than class 1 systems)
    b. In terms of the containment capacity required, <u>all classes</u> of system (all levels of site risk) are required to meet the same standard – that is the requirement outlined, as signposted in the table, in section 4.
- Section 4 (signposted from table 6.2) – applicable to all sites of all scales of risk requires
    a. A local secondary containment capacity based on the details in section 4.2.1
    b. A sitewide containment capacity based on the details in section 4.3
- As above, section 4.2.1 discusses the local secondary containment sizing approaches (either 110%/25% rule or a bespoke calculation based on volume of inventory, plus rain, plus firewater, plus freeboard). Section 4.3 introduces the concept of risk based, scenario-based approach to then consider required, whole site containment capacity.

Thus I would expect to see, for a site that is following CIRIA c736, a site based assessment to include evaluation of both local and sitewide containment needs. As a minimum, each containment area (e.g. each bund) must be capable of containing both the maximum inventory of substances within it and any additional liquids that could be present and add to the overall liquid volumes involved in the incident. In the case of rain, we also expect to see consideration of climate impacts and the recognised increasing rainfall intensity, which could mean the 110%/25% rules are no longer providing sufficient capacity and adaptations (increased containment capacity and measures for rainwater management) need to be implemented to increase the ability to contain larger volumes of liquids during intense rainfall periods – this is acknowledge in the guidance.

I should also highlight that the guidance is not prescriptive. The guidance states that in some cases (e.g. Oil Storage Regulations) there are strictly defined legal requirements that must be adhered to, irrespective of the guidance risk-based approach and relevant regulations take precedent over the general guidance. Conversely the guidance recognises that in some low-risk circumstances it may not be reasonable to expect expenditure to meet full compliance with the guidance. In this latter case the guidance explains the need for operators to

discuss the situation with the regulator and reach an agreement of what is a reasonable and necessary requirement, in accordance with any regulation specific guidance. This would include considering costs and benefits and include consideration of the techniques which are common within a given industrial sector.

In my experience, which has included discussions with Health and Safety Executive around the applicability of the Control of Major Accident Hazard regulations to Anaerobic Digestion (AD) sites, I would not expect Anaerobic Digesters location at Waste Water Treatment works to fall in the low impact / class 1 category. Digestate is relatively highly polluting (compared to the full range of substances covered by regulations), and the presence of flammable atmospheres at these sites increases potential for fire or explosion to escalate to loss of containment events (compared to sites with non-flammable substances). Moreover, the location of such sites is commonly near to surface water receptors, so there are very often links between the polluting source, through pathways which can rapidly transport pollution to environmental receptors. I would thus expect a medium / high risk to be indicated for AD sites and thus a class 2 or class 3 level of containment across the whole site to be indicated. This would necessitate local secondary containment bunds around each tank or groups of tanks, dependent on-site layout. These must be designed and maintained to achieve a capacity of containment of either the 110%/25% rule or the bespoke calculation method if this indicated rain and firewater could create larger volumes that need to be contained. I would find it unlikely that a cost benefit assessment would indicate a lower containment capacity would be required and in fact I would expect a cost benefit assessment would identify several low-cost measures and enhancements to containment which could be implemented in addition to the basic bund requirements (All class requirements in table 6.2, and section 4). This approach would be necessary to fulfil the requirement to use Best Available Techniques, or All Measures Necessary or reduce risk As Low As Reasonably Practicable (similar concepts based in different specific safety and environment legal regimes).

In summary I would not expect reduction in bund containment capacity below that indicated by the 110%/25% rule. Moreover, the scenario based, risk-based approach in CIRIA c736 may indicate a larger containment capacity is required for the site as a whole which could be met be larger bunds (capacity over the 110%25% rule) or could be met by additional tertiary containment capacity,

As previous, I would be happy to discuss this further and provide a statement as necessary to help clarify for all those concerned with the matters at hand.
Please let me know if I can help further.

Kind regards
Mike

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