Case History: Spill Response for the 2014 Somerset Level Floods

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Introduction
With the increase in severe weather events over recent years and the trend set to increase into the future, the frequency of oil spills resulting from flooding and extreme weather is likely to rise. Major headline news around the world within the last year include Hurricane Harvey causing widespread flooding to the United States, Hurricane Irma in the Caribbean as well as monsoon floods in South East Asia. The consequence of which undoubtedly caused countless oil spills and pollution events.

Although small scale, oil spills from boats sinking, storage tanks breaching and on land infrastructure being overcome during these extreme weather events, all contribute to the wider measure of pollution. This adds an additional dimension to not simply a pollution response but a large-scale humanitarian operation, making the implications of spill response in these kinds of environments that much harder.

This case study looks at a single pollution response by Oil Spill Response Ltd (OSRL) to a flooding event in the UK, in this case due to the rupture of domestic heating oil tanks in rising floodwaters. This highlights the operational limitations that came about during this response, the health and safety considerations of responding in a flooded environment, the logistical arrangements in a state of emergency and links how OSRL responded alongside other agencies in the wider response to the flooding.

Main Results

- **Background to the Somerset floods**

During the winter of 2013/2014, the UK suffered a succession of major storms with unprecedented volumes of rainfall and high winds. The low lying area of the Somerset Levels in the South West, reliant upon an aging network of pumping stations and man made drainage channels, was soon overcome by the sheer volume of water. In early 2014 the Environment Agency estimated there were over 100million cubic meters of floodwater covering an area of 65 square kilometres, resulting in extensive flooding affecting over 600 houses and 17,000acres of agricultural land.

Due to the remote nature of many villages on the Somerset Levels, private homes are powered by domestic oil heating systems, comprising of a large (typically 1-2,000l) storage tank in each property's ground. By January many of these tanks, often re-filled for the start of winter, were now only partially full. When the floodwaters hit, many floated free, rupturing supply pipes and hoses to houses. Some of these tanks upturned, spilling their contents while others, completely free, drifted some distance away from homes.

Domestic heating oil systems use kerosene, which once spilled spread quickly in the floodwaters making a thin sheen. Much product was expected to have evaporated or been dispersed into the water, sheen was still reported and the remaining tanks were causing an issue to the response effort as a whole.

- **Response Challenges**

Oil Spill Response Ltd (OSRL) were mobilised on a third party agreement by the Environment Agency (EA). The EA's stretched resources managing the flooding event and limited oil spill equipment meant OSRL were called in first as Technical Advisors and then a small response team to assess the extend of the spills and to action the clean up.

Response Health & Safety

Clear health and safety concerns were apparent when arriving on scene. Polluted floodwaters, not only contaminated with heating oil but also potentially sewage (many homes on septic tanks) and flood debris from homes, farms and commercial properties as well as agricultural run off.

Preventive measures were put in place including appropriate PPE; drysuits, gloves and stringent hygiene methods to ensure the health of response personnel. A dynamic Risk Assessment process was undertaken with

control measures put in place to mitigate those hazards found, many of which fell outside of the usual risks posed on a regular response.

Gas monitoring was conducted to ensure a safe site entry due to the nature of the spilled product, this was not found to be significant but was used upon entering new sites and whenever tanks were found in an enclosed space, such as sheds or lean-to shelters

Entering floodwaters posed its own risks, submerged objects and debris being a significant hazard. A stick was used to feel the way forward when on foot in the floodwaters, common hazards included ditches at the side of the road, submerged layers of sandbags at the entrance to properties and other failed flood defences. The use of technology proved useful to recce on Google Earth exposing hazards such as the location of swimming pools, garden ponds and even churchyard headstones which may have otherwise been unidentified hazards.

The use of small boats also had its risks, an inflatable boat and outboard engine significantly improved access and the speed of response but care also had to be taken to avoid underwater obstructions and debris. The propeller also posed a hazard when used near other responders in the water. A combination of outboard engine and paddles were used to access difficult sites.

The primary concern on any response is the safety of those involved, here more thought was required into the safety systems in place and a dynamic review of hazards had to be made to the risk that presented itself during the response

Interagency Response

Having been mobilised by the Environment Agency, OSRL worked in conjunction with EA staff and resources. The EA's priority being the safety and wellbeing of those affected by the flooding. Pollution response was second to that of the emergency services, on scene at the time included Fire and Rescue Services, the RNLI, local volunteers and a large presence from the press, both local and national media.

Resources, especially transportation was shared out amongst the response services. This included a wide range of vehicles and vessels including farmer's tractors and trailers, small inflatable boats, rigid workboats and tracked vehicles including a Unimog. Logistical arrangements including lay down areas, collection points and welfare facilities were set up and shared. Access to affected areas was controlled by police.

Briefings and updates came from the EA, with their presence in Silver Command, conducting full oversight of all operations taking place. OSRL's input was able to direct decision making of the operations.

- **Response Actions**

Mapping and source control

OSRL's first objective was to survey and map the extent of the pollution and damage to tanks. This was done using GPS tracks, photos and verbal reports. Location mapping along with photos of affected tanks were produced visually on a kmz, able to be viewed in Google Earth. This gave an excellent visual representation of the operation. Any tanks found to be still leaking or could cause further spillage were dealt with. The use of sealant putty, was an initial fix on open pipes or ruptures links. Any upturned and free-floating tanks were righted and made secure.

Product Transfer

Once all tanks had been identified and temporarily made secure, the decision was made to transfer all remaining product in the tanks into more secure storage. Any floating tanks were towed into a single area, which was bunded with sorbent then pumped into storage IBCs. Those tanks that could not be moved were emptied in-situ. Records were kept of volumes of product and the original location of the tanks, some were not identifiable as they were not marked and had drifted away from homes. These records were passed onto the EA.

Clean Up

Any remaining sheen on the water, often close by to breached tanks, was treated where possible. Assisted natural dispersion through propeller washing into a sorbent bund was found to be the most effective. Little else could be done at this stage. Continued rain, wind and water movement was also assisting natural dispersion.

Supporting Images or Graphs

Extent of flooding in Somerset (source: BBC)

Kerosene sheen present in floodwaters

Response effort (OSRL with other agencies)

Identifying and mapping affected tanks

Loose stranded tanks

Pumping out stricken tanks

Transportation of tanks and recovered product (working with EA boat)

Assisted dispersion of surface sheen

Conclusion

Although this instance was a small-scale response with a limited extent of pollution, many lessons can be learnt about responding to a flooded environment. Key learning points about health and safety implications as well as interagency working can be developed and help improve preparedness for the future, when the likelihood is scenarios like this will happen again.

References

Environment Agency (2015)

https://www.gov.uk/government/publications/somerset-levels-and-moors-reducing-the-risk-of-flooding/somerset-levels-and-moors-reducing-the-risk-of-flooding