18 YEARS ON: HAVE THE LESSONS OF BUNCEFIELD BEEN FORGOTTEN?

As the industry progresses, we must keep in mind the lessons from Buncefield, says Peter Savage, HSEC lead for HG Storage International

2023 MARKS 18 years since the Buncefield explosion. This period effectively marks a whole generation away from the biggest explosion and fire in the UK since World War II. This is a potential generation where adults working in the industry won't have lived through this incident, seen the television footage, the media coverage, or the devastation on the ground.

Safety and operations professionals that followed the investigation and received the UK Health and Safety Executive's reports will have moved on and maybe retired from the industry. The memories of Buncefield are now reduced to a handful of YouTube videos and Google searches.

So how do we make sure the learnings from this devastating industrial incident stay in our collective consciousness as we seek to safely, reliably and responsibly operate our oil and gas facilities?

AN INCIDENT UNFOLDS

The Buncefield Terminal, located in Hemel Hempstead, UK, about 25 miles north of London, was developed in the 1950s and 1960s as part of a growing industrial area within an expanding town. The facility grew to become the fifth largest storage facility in the UK, with pipelines feeding into it and storage for oil, petrol and kerosene products.

On the morning of Sunday 11 December 2005 during tank filling operations, one of the site's storage tanks was overfilled, resulting in a loss of 250,000 litres of petrol from containment. This release created an explosive vapour cloud that drifted beyond the tank bund wall and into the surrounding facility. At approximately 6am that Sunday morning, the vapour cloud ignited resulting in an explosion that registered 2.4 on the Richter scale and was heard as far away as the Netherlands.

The resulting fire spread quickly between bunded areas and ignited further tanks within the complex. The blaze took more than 1,500 firefighters over four days to extinguish. There was significant damage to buildings in the local industrial zone, as well as to local residential housing that had been built within a mile of the site in the previous decades.

Amazingly, no one was killed during the Buncefield incident. This may be due to a combination of the event happening relatively early on a Sunday morning, when residents were largely at home and few people would have been at work in the nearby industrial zone.

THE LOCAL IMPACT

As a resident growing up in Hemel Hempstead, the Buncefield depot (as it was referred to by locals) was seen as a benign, sleeping fixture of the industrial area. Surrounded by fields, greenery and country lanes, it featured as the backdrop to a Sunday cycle, an evening stroll or even a lunchtime run for colleagues. It would be fair to say that neither I, nor very few of the neighbouring residents or local workers, had a full grasp of the hazards inside the fence or the consequences of safety failures at that site which, in some cases, was a mile or two from where we slept.

Being woken from our beds that Sunday morning with our homes impacted – in my case fortunately only attic trapdoors flying open and bath panels dislodging – brought the hazard into sharp focus for people living nearby.

The inevitable questions were being asked by fellow residents: how was this incident able to happen so close to people's homes? Had the blast zone really been considered by the town planners? Had the possibility of an explosion really been thought through enough?

THE LESSONS LEARNED

The investigation from the UK Health and Safety Executive into the Buncefield terminal incident was extensive. It examined leadership, management systems and site culture, as well as evaluating local planning permissions during the town's expansion.

Saturday 10 December 2005 **approx. 19:00 GMT**	Tank filling operations commence at Tank 912
Sunday 11 December 2005 **approx. 03:20 GMT**	Tank 912 completely fills & starts to overflow. Fuel/Air mixture collects within the tank bund
approx. 05:38-05:46 GMT	Vapour of the fuel flows out of the bund enclosure
approx. 05:50-06:00 GMT	The vapour cloud starts to flow off-site
approx. 06:01 GMT	The first explosion occurs followed by further explosions and fires in 20 neighbouring tanks
Wednesday 14 December 2005	Final fire at Buncefield site extinguished

The reports prompted questions in the industry. Not only on facility engineering controls, but also safety culture, human performance and emergency preparedness. The regulatory investigation and criminal trial over the years following the incident prompted a suite of checks from oil and gas leaders across the industry with reflection and soul searching in the shape of 'could this happen here?'

The reaction from the industry, though significant at the time, may be looked at now as an immediate response rather than a permanent change to our way of doing things. How many of our leaders could check safety critical equipment on site today at their facilities and assure themselves that maintenance was within specification? Or that procurement processes are adequate for replacement safety critical equipment parts? How many of us could talk about the failures relating to the equipment safeguards that happened at Buncefield and how people's actions, often away from the site itself, could have a direct effect on process safety at their oil and gas facilities?

LOOKING BACK AT BUNCEFIELD, POST-COVID

The last year has seen the global community start to step out of the shadow of Covid-19. However, the legacy of the pandemic remains in many ways. The subtle impacts of the pandemic and the effect of subsequent lockdown restrictions on how we manage oil and gas storage facilities may not be immediately visible and may have consequences to the safety and reliability of our site in the future.

Coupled with the effect of Covid-19, the present day is an increasingly cost-challenged environment, where the capex of projects are inflating due to availability of services and the cost of raw materials. Could these factors be increasing process safety risk on different sites? Are essential maintenance works on bund walls being delayed? Are backlogs on safety critical equipment maintenance and inspection being accepted and tolerated? Are works on maintaining integrity of bund walls, drainage or soakaways being affected by contract and procurement challenges that are not being addressed? Have leaders reinstated pre-pandemic schedules of site visits and checks?

Many site operations teams will have changed out turnaround (TAR) frequencies during the pandemic to limit personnel interaction and due to availability of resources – either materials or teams. Have these delayed timescales between turnarounds become a new normal which has been accepted without being revisited now that constraints on getting work done has eased?

A subtle effect of the pandemic has been the effect on staff turnover and people leaving the industry. Many organisations are now experiencing high attrition rates as people leave roles, move companies and, in some cases, retire. When people permanently leave a site or an organisation, the local memory of how their site manages safety critical equipment leaves with them.

These potential impacts of the pandemic demonstrate worrying parallels with the causes of the Buncefield incident, and therefore a established learning needs to take place.

The memories of Buncefield are now reduced to a handful of YouTube videos and Google searches.

LEARNING FOR THE NEXT GENERATION

After 18 years, leaders should rightly still question themselves on their familiarity with the causes of the Buncefield explosion and fire. In turn, they should use the event at Buncefield to test out their site controls, barriers and mitigations in preventing a similar incident. Do leaders who get their boots on and perform safety walkthroughs at their facilities personally assure that the checks, controls and actions that immediately followed the Buncefield incident are still in place?

It seems now, the lessons of Buncefield are more relevant than ever as we adjust to our post-pandemic world. If operators fail to keep the memory of Buncefield present in their decision-making and through repeated checks, verifications and messaging, they run the risk of repeating the mistakes, and consequences, of the past.

Such checks that operators should be considering are the level of tolerance shown by site management to unsafe process safety conditions, the level of prioritisation for safety critical equipment repairs, understanding amongst non-operational teams of their role in process safety, and the impact of the pandemic on inspections, maintenance and risk assessments.

For more information:

Peter Savage is the HSEC lead for HG Storage International and will be speaking at StocExpo in Rotterdam on 14-16 March.

www.hgstorageint.com

www.stocexpo.com

01 Peter Savage outside his family home on 11 Dec 2005, less than 2 miles from the incident