

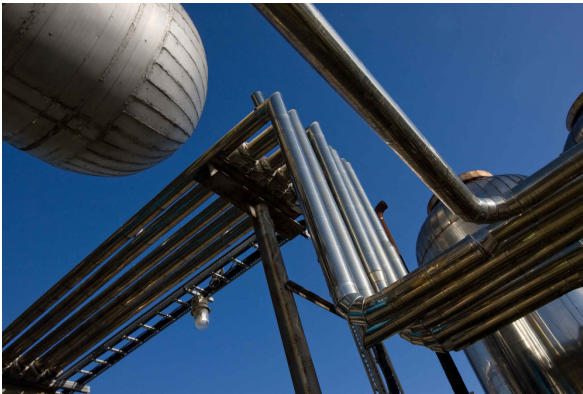


RVA GROUP

Specialist consulting engineering, safety and environmental management
for decommissioning; decontamination; dismantling; demolition.

Case Study: Safety Challenges for Large Scale Decommissioning

The current economic downturn appears to be affecting every area of commerce with quite overwhelming results – globally the number of production facilities being mothballed, rationalised or permanently closed down is staggering, with 10s of 1,000s of jobs being lost every week as a result. However this trend is posing a significant new problem to solve and that is, how to manage the decommissioning – and in many cases the dismantling and demolition – of facilities safely.



Even with the best intentions at heart, when money is tight the eye can come off the 'EHS ball' and that is something no-one can afford – the global downturn doesn't mean hazards are less onerous, or that laws can be flaunted. Thankfully however, when conducting perhaps the largest UK industrial process plant demolition project of the past 12 months, the decommissioning team on GrowHow UK Ltd's Severnside site, near Bristol, ensured that safety was their number one priority.

In September 2007, premier fertiliser manufacturer GrowHow UK Ltd announced the decision to close its 100 acre Severnside plant, located on the eastern bank of the River Severn. Yet from the outset, GrowHow recognised that a project of this magnitude required capabilities beyond their remit of expertise.

CDM co-ordinator and project management consultancy RVA Group was therefore brought in at the end of 2007 to begin planning for the challenging processes that would follow the plant closures in April 2008.

In the extensive and highly complex 30-week programme that ensued, RVA supervised more than 60,000 man-hours of plant decommissioning, isolation and demolition by the contractor,

regulating the clearance of facilities including nitric acid, ammonia, carbon dioxide and ammonium nitrate production plants, utilities equipment, laboratories and office buildings over nine separate locations within the site.

The practical challenges encountered on such large-scale decommissioning projects are certainly substantial. For example, many areas of process plants contain hazardous materials, whether they are corrosive, toxic or flammable, and often these substances have the propensity to become lodged in nooks and crannies. A great deal of attention therefore has to be deployed in preparing equipment and bringing it to a 'known state'. Striking the right balance for the cleaning regime is a vital aspect of the work; going beyond what is required can lead to avoidable operative exposure to hazards and unnecessary costs, not far enough and problems can then arise during dismantling and waste disposal activities. The importance of getting this element of work fully documented and competently executed should not be underestimated.



However the complexities of the Severnside project presented a number of additional challenges. The deployment of traditional dismantling techniques throughout the project for example, was complemented by the controlled use of explosives to bring down the 100 metre tall Prill Manufacturing Tower, which once produced ammonium nitrate fertiliser pellets.

The Prill Tower was a tubular reinforced concrete structure supported on 12 reinforced concrete legs, with process vessels mounted at the top, reached via an external lift shaft and attached staircase. It was too tall to demolish with conventional machinery, and the alternative of manually dismantling it piece by piece would have necessitated operatives working at height for extended periods of time. The health and safety risks associated with such a labour intensive option were simply unacceptable, and the fact that the 4,000 tonne tower had been in operational service for many years added to our concerns.



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RVA knew that the controlled use of explosives was the safest way forward but the fact that the tower had been the production centre for ammonium nitrate fertiliser prills created an added hurdle to overcome. Ammonium nitrate can itself, under certain conditions, become an energetic substance and hence has a potential to explode. If such a chemical residue was to be subjected to either significant impact – as would be experienced when the tower hit the ground during the demolition process – or was to come into contact with a heat source, there was a risk of secondary detonation and explosion. RVA therefore needed to eradicate any potential risks posed by the presence of ammonium nitrate, before a decision could be made.

RVA did this by:

- Taking samples from the structure and surrounding floor slabs to assess the degree of contamination in the concrete
- Holding joint consultations between RVA's explosives engineers and recognised experts to advise both in the properties of ammonium nitrate and theoretical explosives
- Leading a series of hazard study workshops so that each party had a complete understanding of the issues involved and could bring together their specialist skills and knowledge to mitigate any remaining risks
- Undertaking extensive decontamination of the internals of the tower and conducting a video inspection to validate the structure's cleanliness
- Managing the demolition contractor selection process and carrying out rigorous examinations of company structures, experience and safe working practices, to ensure required standards would be met.

Despite concluding that the level of risk posed was minimised, manageable and acceptable, RVA still incorporated into the dismantling contract the requirement for the appointed contractor to engage an additional specialist explosives consultant to provide a secondary assessment and confirmation of their findings.

A test blast operation was completed two weeks prior to the blowdown to validate the design of the charge weight, drilling pattern and primary protection. Having removed one of the legs during the test blast, the contractor devised a collapse mechanism – involving the removal by explosives of the remaining five legs – to ensure the tower would rotate and fall

in a north easterly direction. The explosively charged legs were wrapped with several layers of chainlink mesh covered with geotextile fabric and additional specially fabricated restrained steel plating, to contain and minimise debris spread. A personnel exclusion zone ranging from 200 to 300 metres radius was established immediately prior to the blowdown.

After six months' of blowdown preparation in which RVA liaised with vibration specialists Vibrock, the National Grid and Severnside residents, the tower was reduced to rubble in less than 10 seconds, using 13kgs of explosives in 42 charge locations.

Despite the complexities encountered, RVA remained on schedule and within budget, and there were no reportable or lost time accidents.

In the current economic climate, organisations will understandably be focused on closing down their factories and plants in the most cost effective manner possible, due to the financial pressures that have led to the said situation. However they should not lose sight of the fact that decommissioning is not a straightforward process, and is certainly not something that can be rushed to achieve an accelerated exit. The fact that this undertaking was so successful is to a great extent because GrowHow actively acknowledged these factors.

Co-operation was certainly key throughout, but not just with external specialists. RVA recognised for example, how important it was to work with GrowHow's own experts in order to harness their invaluable knowledge of chemicals. It cannot be expected that a skilled production engineer will become a qualified decommissioning engineer overnight, but when managing a facility decommissioning, the careful use of existing staff alongside experienced specialists is in most cases a positive move – no one knows the plant better than the people that have been running it.

With an almost bizarre twist, preparing plant and machinery for dismantling and demolition can be less onerous than actually operating it throughout its life cycle, for example vessel entry may be avoided, working at height minimised and other inherently hazardous activities eliminated by the use of specialist decommissioning techniques, so long as the best team is assembled for the job, and the company is adequately prepared for the situation.

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