



Contents lists available at ScienceDirect

Safety Science

journal homepage: www.elsevier.com/locate/ssci

Book Reviews

Failure to Learn, the BP Texas City Refinery Disaster, Andrew Hopkins. CCH Australia, Sidney (2008). 186 pp., Price A\$75.00, Soft Cover, ISBN 978-1-921322-44-0

The BP Texas City Refinery disaster blasting away, the 23rd of March 2005, is one of those events that generated a shock wave in and outside the safety community. In the massive publicity following this disaster, the popular media as well as the professional and scientific press stressed once more the importance of process safety management. A total of 15 people died and nearly 200 were injured in the worst industrial disaster in the US in more than a decade. The federal regulator, the Occupational Safety and Health Administration (OSHA) fined BP \$21 m, the largest fine ever, and soon after the disaster BP sacked six of its frontline operators and supervisors. Two years later, an inquiry initiated by the Chief Executive (CE) Refining and Marketing led to the dismissal of managers below the CE, BP's Head of Refining worldwide and of the US, and the manager and assistant manager of the Texas City Refinery.

Immediately after the disaster two separate investigations were started, one initiated by BP and another one by the US Chemical Safety and Hazard Investigation Board (CSB). The BP report was published half a year later, presenting a detailed account of the technical, procedural, organisational, and engineering aspects of the disaster (BP, 2005). CSB also investigated BP's safety performance at Texas City, but extended its research to the role played by the BP Group management, based in London, England. Furthermore, CSB examined the effectiveness of OSHA's supervision (CSB, 2007). During the investigation of CSB a second major fire occurred at the Texas City Refinery, followed by a third major incident a week later. These events were so shocking that CSB urged BP to start an inquiry by an independent panel into "the effectiveness of BP North America's corporate oversight of safety management systems at its refineries and its corporate safety culture". The results have become known as the 'Baker Report' (Baker et al., 2007). All these investigations were high quality, but information on how BP's senior management was thinking and acting became public as a result of an agreement between BP and a single plaintiff, Eva Rowe. During the disaster Eva was 20 years old, and she lost both her parents during the disaster. In a classic David–Goliath battle she insisted that all materials and all evidence supplied during the civic trials were made public, so others may learn from it, and she won.

The ability, or the disability to learn from earlier events is the main topic and focus of Andrew Hopkins' book, as its title already suggests. He was invited by CSB in his capacity as an (Australian) social scientist to participate in their inquiry. At that time all reports explained the mechanical conditions and human factors that surrounded the moment of the explosion. How the disaster had happened was already clear, but not exactly why. Given the huge amount of information that is available, Hopkins' book presents a very readable and detailed account of the malfunctioning of a (safety) management system that is focussing on lost time injuries as key performance indicator, rather than process hazards, its high degree of decentralisation, and, consequently, its inability to learn from previous process incidents. He presents an excellent case

study textbook case, intended for the non-technical reader, who may be put off by refinery jargon otherwise. His book can be of use during safety courses and for education, but it is also of value to (senior) managers, regulators and lawyers. It is not the first time Hopkins has made an extensive analysis of a major accident. His book 'A lesson from Longford, the Exxon Gas Plant Explosion in Australia' is another example with a similar focus (Hopkins, 2000). Reading these books, there is a frightening similarity between these and other industrial disasters.

The direct cause of the explosion may be familiar to most readers; a frontline operator overfilled a distillation column during a start-up procedure, leading to a geyser-like eruption of liquid and gas. In the absence of a flare, the vapour cloud was ignited by a vehicle in the area with its engine idling, blasting away a number of portable offices located too close to the plant, and killing its occupants. There is tendency to blame the frontline operator as well as the supervisors and managers who decided not to install flares, and to allow vehicles and portable offices so close to the plant. But blame is always the enemy of true understanding and operator error should not be an explanation in its own right, but the starting point of an inquiry. The 'why question' should be asked repeatedly, moving the focus away from a potential violator to the causal chain of events. The same is true for the concept of organisational culture as the endpoint of a causal analysis. Once explanation stops, blame takes over, and there is a tendency to blame all those caught up in that culture.

Layer for layer Hopkins takes apart the (safety) management system of the Texas City Refinery and BP Group management in London and discloses a whole web of malfunctioning of managers and the incapacity to actually learn. For frontline operators, overfilling was not a risk, but under filling was. These operators were not trained in handling abnormal situations or process disturbances, just because simulators for this type of training were found to be too expensive; a rather strange argument for the second largest company in the oil and gas industry. A management decision not to proceed with the start-up procedure when the storage tanks were full was not communicated to operators, and the start-up could also continue during a shift change. These are only some examples of a much longer list of barrier failures and underlying management factors, which find their basis in a rigorous company policy of cutting costs and the primacy of total recordable injuries as a measure of safety. This dominance was so extreme, that even the CEO was linking BP's technical integrity problems to personal injury statistics. Injury rates were 'where it's at' at BP. Consequently, reporting systems of process incidents was hardly operational, and process safety was only seen as a service, like any other service. Meaning the company did not pay too much attention to the topic. In 13 short and well-written chapters, Hopkins book is disclosing various aspects of BP's management, starting at the Texas City Refinery, and slowly moving towards BP's inability to take process risks seriously, both in Texas and in London, the consequences of the cost mantra, which was linked to the company's rewarding structure, the bizarre consequences of blame allocation, and the difficulties encountered when 'bad news' is trying travelling upwards on the company's hierarchy.

Apart from analysing malfunctioning, leading to learning disabilities and blindness to major risks, chapters also provide a direction for possible solutions. For instance, by knowing that problems encountered at BP are not exclusive for this company, but seen in many different organisations, this could explain the similarity between disasters. Process safety is not only an important topic in industry, but also a difficult one to tackle. Discussion on this topic is continued in a recently published issue of *Safety Science* by guest editors Hopkins and Hale (2009) on Process Safety Indicators. The last chapter is dealing with OSHA's role as regulator and supervisor. Hopkins is questioning the efficacy of the fine imposed by OSHA, which only equals 1% of BP's profit of the year of the explosion. Clearly OSHA was trying to punish BP for causing the disaster, while its penalty structure is designed as a proactive system to prevent accidents at companies inspected. OSHA promulgated a comprehensive process safety management standard. But with only one planned inspection at the Texas City facility in 13 years prior to the disaster, OSHA simply did not have the resources to enforce its regulations effectively.

References

- Baker, J., Bowman, F., Erwin, G., Gorton, S., Hendershot, D., Leveson, N., Priest, S., Rosenthal, Tebo, P., Wiegmann, D., Wilson, L., 2007. The report of the BP US refineries independent safety review panel.
- BP, 2005. Fatal Accident Investigation Report. Isomerization Unit Explosion Final report Texas City, Texas, USA, December 9th.
- CBS, 2007. US Chemical Safety and Hazard Investigation Board. Investigation Report Refinery Explosion and Fire. Report no 2005-04-I-TX, March.
- Hopkins, A., Hale, A. (guest editors), 2009. Process safety indicators. *Safety Science* 47 (4), 459–510 (special issue).
- Hopkins, A., 2000. Lessons from Longford: The Esso Gas Plant Explosion. CCH Australia, Sydney.

Paul Swuste
Safety Science Group,
Delft University of Technology,
The Netherlands
Tel.: +31 152783820
E-mail address: p.h.j.swuste@tudelft.nl