

Organic Process Research & Development

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Editorial

Could This Happen in Your Company?

The recent U.S. Chemical Safety Board Final Investigation report on the March 2005 Texas City explosion at BP's refinery where 15 people were killed and 180 injured (available at www.csb.gov/completed_investigations/docs/SbfinalreportBP.pdf) should be required reading for all managers involved in development and manufacture of chemical and allied products. The report runs to over 300 pages and is therefore unlikely to be read cover to cover by managers; I have to admit I have only skimmed through it. However, the executive summary is under 30 pages and contains lots of useful information regarding the safety culture in an organisation. Some of the key issues which contributed to the incident are highlighted below.

1. Inadequacy of alarm systems and failure of those that were installed to activate.
2. Control board did not provide adequate information.
3. Lack of supervisory overseeing of operations and lack of trained personnel during an especially hazardous period (i.e., start-up)—contrary to BP's own safety guidelines.
4. Poor communication of information, particularly during shift changeovers.
5. Operators were likely fatigued from working 12-h shifts for 29 or more consecutive days.
6. The operator training programme was inadequate (Control Training Department staff had been reduced from 28 to 8).
7. Outdated and effective procedures did not address recurring operational problems during start-up.
8. Start-up was initiated despite malfunctions of some controls.
9. Trailers, used to house contract staff, were sited too close to a process unit handling highly hazardous materials. All fatalities occurred in and around the trailers.
10. In previous years there had been eight serious releases of flammable material, but these had not been investigated properly.

11. Management did not implement their own prestart-up safety review policy to ensure that non-essential personnel were removed from the area during start-up.

The report suggests that cost-cutting, failure to invest, and production pressures impaired safety performance at Texas City. Process equipment was “run to failure” and not replaced when necessary. Reliance on a low personal injury rate as a safety indicator failed to provide a true picture of safety performance and the health of the safety culture. A checkbox mentality existed which resulted in boxes being checked even when those requirements had not been met.

The Texas City site also lacked a reporting and learning culture. The lessons from incidents and near misses, both at the site and at other BP locations, were not learned. Whilst surveys and audits had previously identified deep-seated safety problems at the Texas City site, the response of BP managers was often “too little, too late”. (It should be stressed that the above views are those of the CSB investigation team, and many of these points are disputed by BP management.)

However, for those of us involved in development and scale-up, and manufacture of chemicals involving hazardous materials, there are many lessons that can be learned.

For those in the fine-chemical and pharmaceutical industries, the first indication that a process is “out of control” may be when a yield is low (or occasionally very high) or that the product is out of specification. Investigations at this stage may reveal why the process is “out of control”, and modifications may lead to a safer and more robust process. Quality and safety are often related.

When pressure is tight and deadlines are looming—both common in industry these days—there is a tendency to cut corners, and this can lead to potential safety problems.

Cost cutting was also identified in the BP report as a contributory factor, and this applies in all industries. The cost of doing something is usually evaluated, but there is also a cost of *not* doing something, which is rarely mentioned.

The financial loss of the BP explosion exceeded \$1.5 billion. Further incidents at the BP Texas City site after the March 2005 explosion caused on one occasion \$30 million in damage and on another occasion \$2 million property loss. Cutting costs on safety issues, therefore, does not make economic sense.

I hope all readers can learn from the above discussion; the reporting of these incidents in full helps to prevent future incidents and to save lives. I wish the government safety authorities in other countries, particularly the United Kingdom, would publish more widely the results of incident investigations, including near-misses and potential runaways.

Call for Papers: Special Issues

The following special issues are planned for 2008, and papers are invited from academic and industrial labora-

tories. In the March/April issue of 2008, a “cluster” of papers on Fluorine Chemistry will be published (deadline for receipt of manuscripts is 1 September 2007). In the July/August issue of 2008, there will be a special issue on Phase Transfer Catalysis, coordination by Jaan Pesti and Marc Halpern (deadline date for submissions 31 December 2007).

In addition we are planning other special issues in 2008 on “Transition Metal C–C and C–N Bond Formation” and on “Continuous Processes”. Please contact Sue Parsons or myself if you are interested in submitting a paper on any of these four topics.

Trevor Laird
Editor

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