

Bhopal, twenty years on – could it happen here?





The photographs used in this article were all taken by award winning photographer, Raghu Rai in the days immediately following the Bhopal catastrophe. The images are reproduced with the permission of Greenpeace (www.greenpeace.org).

Graeme Bell – Managing Editor, SA Instrumentation & Control

December 2004 is the 20th anniversary of the Union Carbide ‘accident’ in Bhopal, India. A methyl isocyanate leak immediately killed 8000 people and subsequently more than 20 000 deaths and 500 000 injuries have been directly attributed to the disaster that has been described as ‘The Hiroshima of the chemical industry’. We ask, could this happen in South Africa?

Mainstream press has contributed to South African petrochemical refineries having a rather tarnished reputation for safety and environmental issues. Various environmental groups also regularly climb in boots and all and lambaste the local refineries for their alleged ‘don’t care’ attitude. But do the refineries really deserve this reputation?

In May 2004, *SA Instrumentation & Control* contacted the press offices at Sapref, Engen and Sasol. We offered the companies the opportunity to give ‘their side of the story’ and tell us about any ‘programs and targets’ regarding critical control measures that they have/are implementing to minimise the risk associated with what everybody agrees is a potentially very dangerous process. We initially contacted the press offices telephonically and then followed the conversations up with an e-mail addressed directly to the relevant person. We asked the companies to reply within seven days. To date we have not received a reply from even one of the three companies. Not even a ‘no comment’ or ‘we can’t talk about this because of confidentiality issues’.

It is completely understandable that some of the technologies that refineries use may be secret and not open to discussion in the public arena. It is also possible that the public relations departments just couldn’t be bothered to descend from their ivory towers to mingle with the commoners at plant-level (ie, engineering and operations staff) to try to find out what is really happening about safety. Or perhaps the companies just do not have the necessary critical control programs and targets in place? Hopefully the question is just rhetorical.

Bhopal in perspective

A petrochemical plant without proper safety mechanisms in place is a terrifying thought. One just has to think back to Bhopal (December 1984). Martin McLaughlin of The International Committee of the Fourth International puts the results of the incident into perspective when he describes the effects of methyl isocyanate as, “... five times more toxic than the phosgene (mustard gas) used as a weapon in the trench warfare of World War I. It is especially damaging to the soft tissues of the body – eyes, mouth, nose, throat, lungs, and reproductive organs. Many of the victims died by drowning on their own mucus and vomit.”¹

He goes on to say about the accident, “From the standpoint of capitalist law, Bhopal was an ‘accident’, and not an act of homicide against a helpless population. It was a nonetheless monstrous crime. Subsequent investigations revealed that there had been repeated safety violations at the plant – faulty valves, cracked storage tanks, a lack of automated systems for filling tanks or stopping gas leaks,

a lack of emergency evacuation procedures, a total lack of training of the plant staff.”

More than 500 000 people are apparently still trying to obtain compensation from Dow, the entity that effectively owns Union Carbide. To put the reparations by the corporation into perspective, Exxon paid US\$940 for cleaning each oil-contaminated sea otter following the Exxon Valdez oil-spill off Alaska.² The Bhopal payouts to date have been a paltry US\$570 per person which, despite Dow-Carbide’s now famous dictum that ‘\$500 is plenty good for an Indian’, do not even begin to cover the medical expenses the victims have had to cover for the past two decades. It makes one wonder what would be ‘plenty good for an African?’

Is South Africa immune to such disasters?

Could a disaster of similar scale happen in South Africa? Many of us like to think of South Africa as ‘one above the rest of the developing world and a technological leader’. “Something like that would never happen here,” we like to think. But is this true?

By way of a small sample of our South African safety record, a quick search on the Internet revealed the following incidents.

- ☐ In March 2001, *Independent Newspapers* reported that Sapref accidentally released 25 tonnes of tetra-ethyl lead only 200 to 500 metres away from neighbouring homes. A few months before Sapref was reported to have spilled a million litres of fuel from a damaged pipeline. In October 2003 *The Mercury* reported a diesel leakage of 75 000 litres into a storm water canal.
- ☐ In March 2004, Merebank residents complained of gas emissions from the nearby Engen refinery.
- ☐ In June 2004, Sapa reported an explosion at Sasol’s Secunda plant that killed one person and injured seven others.
- ☐ Sapa reported that in December 2001 a Petronet pipeline running through the grounds of a primary school at Tongaat just outside of Durban, exploded causing thousands of people to be evacuated from their homes.
- ☐ In 1997 the *ANC Daily* reported an explosion at Mossgas in a methane reforming unit.
- ☐ *The Cape Times* reported a massive oil blowout at the Caltex refinery in Milnerton in July 2004. The blowout, which happened during a scheduled shutdown, rained oil-drops down on neighbouring cars and houses.

This list is by no means a definitive record, or an indication or

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implication of whether the blame for the alleged accidents lies with the refinery involved. However, it is a clear indication that South Africa is not immune to a potential disaster of enormous scope.

Despite all the bad press given to the industry by these and many other incidents, when approached to give 'their side of the story' our three major petroleum businesses chose to abstain from commenting or even attempting to show the improved safety measures that they have put in place. Most curious behaviour.

I know that there isn't a single South African control and instrumentation engineer or technician that does not want to feel proud of the safety record of the plant that he works in. Why shouldn't everybody feel proud about the company that they work for? From first-hand experience I also know that many of the engineering staff from all levels of seniority believe passionately in ethical and correct safety practices. Many of them are also employed by the three companies we approached for comment: Sasol, Sapref and Engen. Furthermore, companies like Sasol have put South Africa on the global corporate map by using what some would argue is 'leading technology and brilliant business skills'. (Interestingly enough, when we asked the Proudly South African Campaign³ (August 2004), Sasol was not a member of the organisation.)

So how can we explain the South African petrochemical industry having such a seemingly dismal safety record?

Safety does not preclude profits

Dick Perry, a specialist control systems engineer in Safety Instrumented Systems and council member of the SAIMC, does not believe that our industry is that bad and that it all boils down to a poor perception of a 'safety culture'. "Safety must be driven from the top downwards," he says. "The senior management (at board level) must be the drivers of safety. Business decisions cannot be made solely on the basis of returns and bottom line profits."

He continues, "The Major Hazardous Installation Regulations of our OHS Act 1993, requires that a well documented Hazard Analysis be conducted on all new and existing installations every five years to identify potential risks and minimise these to acceptable levels. This exercise usually takes the form of a hazard and operability (Hazop) review followed by Safety Integrity Level assessment to ensure that the required risk reduction levels are met in all three categories of personnel protection (including the general public), environmental and the owners facility." He adds, "The reviews with which I have been associated, show no lack of safety awareness by any owner company, or a desire to take 'short-cuts' or to reduce the required safety protection measures to meet these risk reduction requirements."

Investors put enormous stress on companies to deliver high financial results and to deliver them immediately. The very nature of our business processes means there is often no concern for the long-term picture or profitability of the company or the community that it serves. Certain companies do manage to deliver results better than others, eg, Sasol recently announced its 49th dividend despite what it described as a "severe adverse impact of a stronger rand," but the financial pressures exerted on the company are nevertheless the same.

Perry is insistent that good safety helps drive good profits. "End-users with a poor safety record have poor productivity and are finding it increasingly difficult and expensive to get insurance cover," he continues. "The South African petrochemical industry has certainly seen some good improvements with respect to safety and the introduction of the new international safety standards (IEC61508 and 61511). However, there are some companies that are not as good as they can or should be, if they think that good safety measures are expensive, just wait until they have a serious accident."

With regards to a 'Bhopal-type' disaster in South Africa, Perry has the following to say, "It could happen in South Africa ... complacency is the enemy of safety. Globally our end-facilities are probably no worse or better than most other industrial countries. It should also be remembered that it isn't just about what is happening inside the plant. Our country has many pipelines running across it carrying highly hazardous materials. To-date, apart from a few incidents, these pipelines have a good operating record with the required emergency plans in place with all the local authorities."

A business manager at one of the large automation companies that has a presence in sub-Saharan Africa, adds the following from a manpower and training perspective, "Few people in Africa truly understand critical control and the role that it has to play in safety. Our top engineering staff are comparable with the best in the world. The problem is that there are just not enough of them."

He puts the problem into perspective by elaborating on the progression of technology. "In the early 1970s critical control was for all practical purposes non-existent. In the '80s we saw a few progressive companies adopting critical control systems, whilst only a handful of vendors and instrumentation companies manufacturing triple-safe control systems. This has progressed to the point where control system vendors can now supply 'off-the-shelf-pre-packaged' critical control systems. Of concern is that even though the physical systems have become cheaper and are more readily available, critical control is a complicated discipline that very few people have mastered."

Conclusion

Incidents such as 3-Mile Island (1979, USA), Chernobyl (1986, USSR) and Bhopal (1984, India) are a stark reminder that complacency, poor training, technical failure and bit of bad luck thrown in for good measure, can have terrible consequences. Furthermore, catastrophe has no international borders.

If the King II report on Corporate Governance in South Africa is anything to go by, then a company and its board of directors (in their personal capacity) will in all probability be held publicly and legally responsible for negligence in the event of catastrophe at a petrochemical plant ... don't collect \$200, go straight to jail.

1 <http://www.wsws.org/articles/1999/aug1999/chem-a06.shtml>
 2 http://www.greenpeace.org/international_en/features/details?item_id=80709
 3 <http://www.proudlysouthafrican.co.za/members/index.asp>