

## Technical Biography

# Eur. Ing. Barry John Cunliffe

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B.Sc. (Hons), C. Eng., C. Sci., M. I. Chem. E., M. E. I., M. I. Diag. E.

Member of the Society of Expert Witnesses

## Principal Process Safety Specialist

### Education

- B. Sc. (Hons.) (Chemical Engineering), 1982

### Certifications and Affiliations

- Chartered Engineer (C. Eng)
- Chartered Scientist (C. Sci)
- Member of the Institution of Chemical Engineers (MIChemE)
- Member of Energy Institute (MEI)
- Member of the Institute of Diagnostic Engineers (MIDiag.E)
- Member of the Society of Expert Witnesses

### Experience

**1983** Safety Supervisor (Catomance Limited)

**1988** Group Engineering Manager (Catomance Limited)

**1991** Specialist Inspector of Process Safety and Flammable Materials (HSE)

**1998** Consultant Engineer (Chilworth Technology Ltd)

**2000** Principal Process Safety Specialist (Chilworth Technology Ltd)

**2016** Principal Process Safety Specialist (Sigma-HSE (UK) Ltd)

**2021** Process Safety Manager (F.E.S. (EX) Limited)

### Career Résumé and Specialist Areas of Expertise

I left University in 1982 with an Honour's degree in Chemical Engineering. I then joined a biocide manufacturing company where I eventually became the Group Engineering Manager.

In 1991 I joined the Health and Safety Executive as a Specialist Inspector of Process Safety and Flammable Materials, where I gave advice on the safe storage, processing and use of flammable materials, be they solids, liquids or gases.

I have given Expert Witness support to the Health and Safety Executive on many occasions, where I have expressed an opinion to the court on what is a suitable and sufficient means of ensuring safety. In more cases than not, however, the defendant pleaded 'Guilty' after seeing my statement. In my time with the Health and Safety Executive, I never lost a case.

I have appeared at The Old Bailey, and other Crown Courts, at Magistrate's Courts and at Inquests as an expert witness on numerous occasions. Whilst in training in HSE I personally prosecuted two companies for breaches of legislation in the Magistrate's Court.

Whilst in the HSE I sat on the Institution of Chemical Engineer's Continuous Professional Development committees, both Policy and Implementation.

After seven years with the HSE, I realised that I missed the private sector. Although I had joined the HSE with a view to establishing my career there, I decided that my career development would be in the private sector. I therefore joined Chilworth Technology Limited, in February 1998, as a Consultant Engineer. Within just over one year, I was promoted to Senior Consultant Engineer. In May 2000, I was again promoted to Principal Process Safety Specialist.

In May 2016 I joined Sigma-HSE (UK) Ltd in Winchester as a Principal Process Safety Specialist. I consider that the main attributes I bring to Sigma-HSE are:

1. Industrial experience, from 8 years in industry.
2. Legal expertise.
3. Legal interpretation of Health and Safety legislation.
4. Risk Assessment.
5. The knowledge that all my reports should be written in such a way that they are presentable to court, if necessary, to justify my opinion.

Acting in my consultancy capacity I have offered advice on the safe processing and storage of flammable materials, undertaken many incident investigations, advised on existing and proposed plants and been involved in HAZOPs, risk assessments etc. I undertake this work in both this country and abroad; I have been to Belgium, Italy, France, Czech Republic, Bulgaria, Turkey, South Korea, Indonesia, Philippines, USA, etc., where I offer my advice to companies on what is 'reasonably practicable'.

I have also prepared a series of documents for a pharmaceutical company with the titles:

- Process Safety Management Manual
- Process Safety Technical Manual
- Inerting Systems Design And Management Technical Guidelines

I undertake 'site wide' safety assessments and audits, not just on process safety issues, but covering other safety issues as well, which I learned in my time in industry and in the HSE.

The range of expert witness work I have been involved with includes the following:

1. 'Normal' fire and explosion issues.
2. Explosion in a large, occupied, tower block in London.
3. Carbon monoxide poisonings, fatal and non-fatal.
4. Transportation of aluminum etchant solution in an aluminum tanker (where hydrogen generation could have been a problem and I had to undertake investigations on behalf of the defense to try to show this was not a risk).
5. Ammonia explosion.
6. Textile fires of varying scale.

7. Crumb rubber fire and explosion investigated on behalf of the Irish Health and Safety Authority as a 'designated' Factory Inspector.
8. Acetylene-production explosion and start-up verification on behalf of the Irish Health and Safety Authority as a 'designated' Factory Inspector.
9. Metal fire and explosion in sanding process.
10. Hydrogenation (hydrogen process) major incident.
11. Major sugar explosion.
12. Explosions in food dryers.
13. Major explosion in large spray dryer.
14. Alleged arson against building, car and shop front.
15. Alleged GBH using flammable liquids on the person.
16. Fire in a carbon bed absorber.
17. Fire and explosion in a ducting system to a wet electrostatic precipitator.
18. Fire and explosion in a food ring dryer.
19. Arson charge against an employee concerning serious damage to railway property.
20. Investigation into a 'wax tank' explosion.
21. Attendance at court in The Netherlands regarding a fatal explosion in a dryer where the inerting system failed.
22. Assessment of over 10 UK-based agricultural grain sites.
23. Fire and explosion in a plasticizer hopper – eventually leading to the conclusion it was a case of 'arson' although no one was ever charged.

The last case on the list concerned an explosion in a small hopper which killed an employee of a company, and, following my investigation, I believe arson was the cause. This opinion I had to defend against a Barrister acting for the family of the deceased at an Inquest. My conclusion was that the explosion was caused by 'ignition by naked flame by person or persons unknown in circumstances unknown', a term I called 'petty arson'.

I do not consider that my Expert Witness opinions have altered in my changing from UK Government HSE to commercial technical consultancy. Instead, industries are asking for my advice, rather than it being enforced on them, and this has been largely due to my knowledge of HSE and the Health and Safety at Work Act etc.

I assess, review and audit Management Systems and undertake site-wide health and safety audits, flammable materials audits and assessments (the Dangerous Substances and Explosive Atmospheres Regulations 2002 in the UK but generally known as the ATEX Directive).

### **Specific Experience with Hydrogen / Hydrogenation**

I have investigated a number of hydrogen incidents, when hydrogenation reactions go wrong, and offered advice on their safe operation. I have also investigated an incident on the Thames where hydrogen from a 'wet' battery ignited in a confined space and caused an explosion.

I have given advice on the means for ensuring safety when installing and using hydrogen systems.

## **Specific Experience with Boiler Systems**

As far as industrial boilers are concerned, I have investigated an explosion in a boiler where the burner ejected during commissioning and killed the commissioning engineer. I have investigated a failure in a high-pressure hot-water product dryer, where the plates underwent a BLEVE (Boiling Water Expanding Vapour Explosion). I have looked at the operation and maintenance of boilers, and, when I was in industry, I was in charge of the safe operation of the company's steam boiler plant.

I have assessed the management of a boiler when it failed (non-dangerously), but the plant was out of action for three days and the pharmaceutical company lost so much money with no production, that I thoroughly audited and assessed their management and control systems for the boiler, showing it to be poorly managed.

I have investigated explosions caused by leakage of natural gas from a boiler, which would have killed many people (it was in a block of flats of 20 stories and it tore through the lower seven floors). However, luckily, it was at 02.00 in the morning and so no one was injured.