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hazardex 2019

27th & 28th February · Runcorn · Cheshire · UK

incorporating PPTeX

ESSENTIAL INTELLIGENCE
FOR CHANGING TIMES

CONFERENCE NOTES

OPENING TIMES

Wednesday 27 February 2019
9.00-17.30

Thursday 28 February 2019
9.00-15.35

EVENT SPONSORS:

TROLEX

PR electronics

WITH THE PARTICIPATION OF:

HSE Health & Safety Executive

IChemE

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TOTAL

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TSA

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RUNCORN, CHESHIRE, UK

27|02|19
28|02|19

Signal conditioning devices *you can trust* *from PR electronics*

PERFORMANCE MADE SMARTER

Visit us at the Hazardex & PPTex Conference in Runcorn, Cheshire from 27 - 28 February 2019! Our team will be ready at Stand 20 to discuss how to make your industrial process management safer, more reliable and more efficient!

Our highlights:

- Devices for harsh and hazardous environments: the PR 9000 series
- The 5437 2-wire HART 7 temperature transmitter

In the spotlight:

7501

Field mounted HART temperature transmitter

TEMPERATURE | i.S. DEVICES | COMMUNICATION | MULTIFUNCTIONAL | ISOLATION | DISPLAYS

PR electronics is the trusted partner for the process and factory automation industry.

We specialize in making industrial process control safer, more reliable, and more efficient. Since 1974, we have been dedicated to perfecting our core competencies creating highly precise signal conditioning devices with low power consumption. This dedication means we set new standards in products that communicate, monitor, and connect our customers' measurement points to their process control systems.

Read more: prelectronics.com

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Hazardex Conference & Exhibition 2019

The essential business forum for everyone involved in the safe and efficient operation of hazardous area plant and equipment

Conference Notes

These notes contain details of the papers presented at the Hazardex 2019 Conference, held at the Holiday Inn Hotel, Runcorn, Cheshire, UK on 27 & 28 February 2019.

Each author has supplied the organisers with a biographical profile and a summary of the paper. Audio-visual material used to support the presentation is available on the USB stick in the Delegate Pack.

These notes also contain essential background information on the accompanying Exhibition, including a floorplan for the event and exhibitor contact details.

For the first time, the 2019 Hazardex event will also feature conference papers and exhibition stands dedicated to Personnel Protective Technologies (PPTex), equipment incorporating electronic and technological systems that the user can wear, hold or use to minimise hazards at work.

PPTex will be an increasingly important aspect of the Hazardex world over the coming years.

Please take some time during the event to visit the exhibitors and participate in any relevant seminars and workshops.

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Welcome to Hazardex 2019!

To make your participation at Hazardex as easy as possible we have compiled the following information, which covers basic hotel, venue and event details. For any further information, speak to the organisers at the Conference Reception Desk. Please enjoy the exhibition and we wish you a successful and useful conference.

Event Venue: The Holiday Inn Hotel, Wood Lane, Beechwood, Runcorn, WA7 3HA, UK
www.holidayinn.com/runcorn

Conference Venues: The Main Conference will take place in the Cheshire Suite and the Seminar & PPTex stream in the Halton Room.

Special Events: Trolex will host a sponsor's lunch and product launch in the Aston Room at 13.00 on Wednesday, Cogent Skills will hold a series of briefings in the Helsby Room and Beamex some workshops in the Bridge Room. Times for the last two will be posted outside the venues.

Gala Awards Dinner: The dress code for the Gala Dinner is business suits, ties optional. The drinks reception will be held in the hotel bar next to the Cheshire Suite (where the main conference sessions are being held) from 18.30. Dinner will commence at 19.30 in the Cheshire Suite.

Products & Services: Please take time to view the Exhibition during your lunch and refreshment breaks. The companies represented are all leading suppliers of equipment and services for hazardous areas and should be able to assist you with any query you may have.

Exhibitor Contact Details: These can be found at the back of this Conference Pack.

Check-In: You will be able to check into your room any time from 14.00 on the day of arrival. A swipe of your credit card will be taken upon checking-in, so that any extras can be charged to your room and settled upon departure.

Check-Out: All guests must vacate their hotel rooms during the morning of the 28 February (or day of departure) - by 11.00 at the very latest. Any extra costs must be settled with your hotel upon departure. Please leave sufficient time to check out as it may be very busy and could reduce your time in conference.

Taxis: These can be ordered from the Main Reception of the hotel.

Assessment Forms: Please would all Delegates/Speakers/Event Partners/Sponsors complete an Assessment Form, found at the back of this Conference Pack, and hand it to the organisers at the registration desk upon departure. This will enable us to improve future events and ensure they fully meet your needs.

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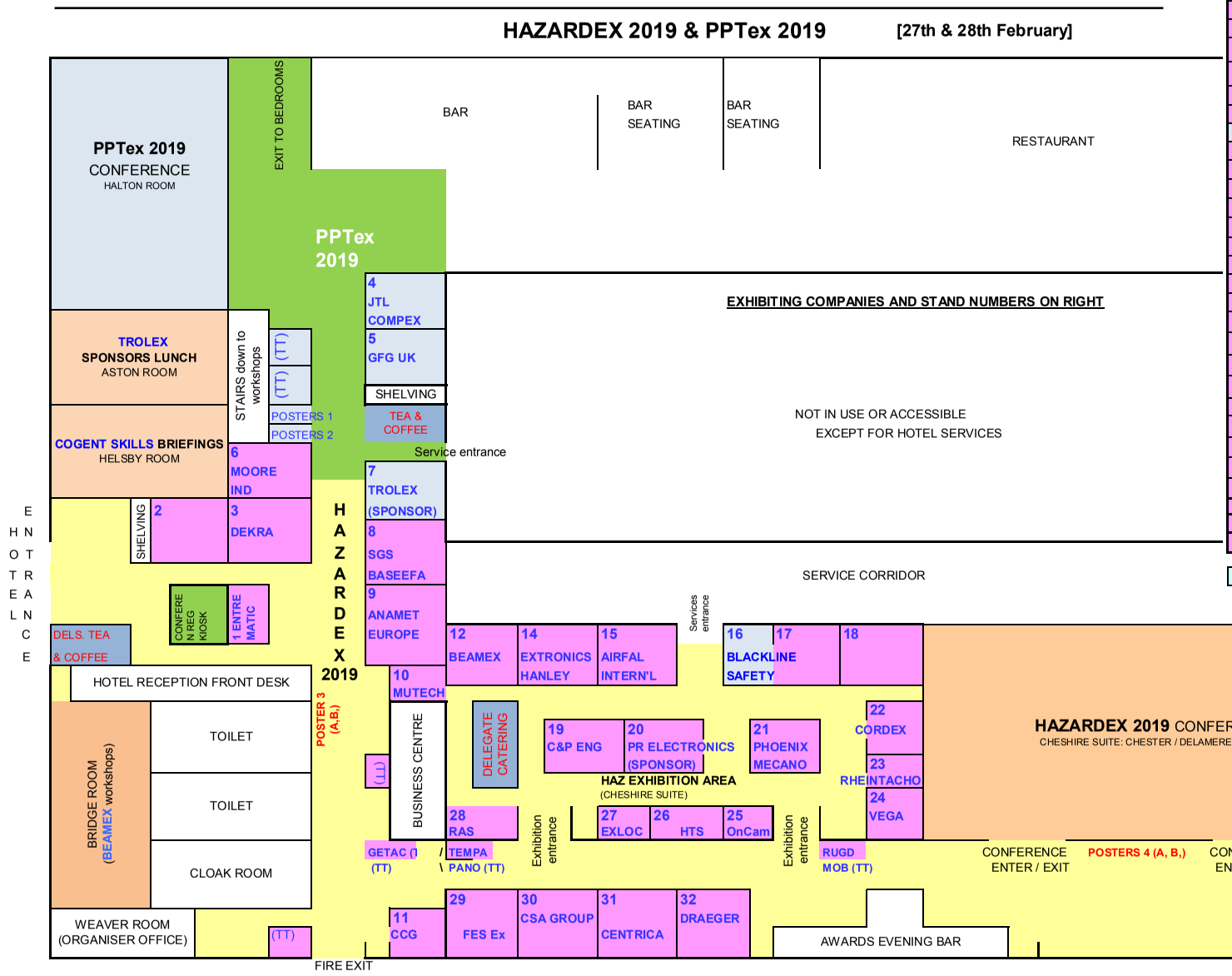
Floorplan and exhibitor list



STAND #	EXHIBITOR
1	ENTREMATIC BELGIUM
3	DEKRA INSIGHT
4	JTL COMPEX
5	GfG GAS DETECTION UK
6	MOORE INDUSTRIES
7	TROLEX
8	SGS BASEEFA
9	ANAMET EUROPE
10	MUTECH
11	CCG
12	BEAMEX
14	EXTRONICS / HANLEY
15	AIRFAL INTERNATIONAL
16	BLACKLINE SAFETY
19	C&P ENGINEERING
20	PR ELECTRONICS
21	PHOENIX MECANO
22	CORDEX
23	RHEINTACHO
24	VEGA
25	ONCAM
26	HTS GROUP
27	EXLOC
28	RAS
29	FES EX
30	CSA GROUP
31	CENTRICA
32	DRAEGER
TABLE TOP 1	GETAC
TABLE TOP 2	TEMPA PANO
TABLE TOP 3	COGENT SKILLS
TABLE TOP 4	RUGGED MOBILE SYSTEMS
SPONSOR	TROLEX - Aston room
BRIEFINGS	COGENT SKILLS - Helsby room
BRIEFINGS	BEAMEX - Bridge room

PPTex	Hazardex

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HAZARDEX & PPTEX 2019 – PROTECTING PLANT, PROCESS & PERSONNEL

Running order subject to change
Check www.hazardexonthenet.net for the latest updates

HAZARDEX CONFERENCE 2019 – DAY 1

8.00 – 9.20: Registration & coffee

Day 1 Morning - Keynotes, Leadership
Main conference room
Chairman: Lee Allford, Energy Institute

9.20 – 9.30: Chairman's introduction

9.30 – 10.10: **Ken Rivers - President, IChemE, and CoMAH Strategic Forum Chair**
2019 - The Year of Leadership in Managing Major Hazard Risks

10.15 – 10.55: **Paul Logan - HSE, Head of Chemicals, Explosives and Microbiological Hazards**
Managing Major Hazard Risks - A Cross-Industry Initiative

11.00 - 11.25: Coffee & exhibition viewing

11.30 – 12.10: **Brian Cowell - Managing Director, EDF Energy Generation**
UK Nuclear Generation - A Decade of Transformation

12.15 – 12.55: **Dr Jo Nettleton - Environment Agency Deputy Director, Radioactive Substances & Installations Regulation:** *Major Hazards Leadership: Past lessons and future challenges*

13.00 – 13.55: Lunch

Day 1 Afternoon - Stream 1 – Challenges & Lessons Learned
Main conference room
Chairman: Lee Allford, Energy Institute

14.00 – 14.40: **Peter Davidson - Executive Director, Tank Storage Association**
Decarbonisation and the Road to Zero

14.45 – 15.25: **Tom Nobes - Process Instruments Capability Leader, Sellafield**
Decommissioning at Sellafield - Implications for Control & Instrumentation

15.30 - 15.55: Coffee & exhibition viewing

16.00 – 16.40: **Geert Vercruysse - Process Safety Expert, BASF**
Lessons Learned from Incidents

16.45 – 17.25: **Terry Cooper - Former Global Head of Integrity & Major Risk Management, Total**
Forty Years of Major Hazard Prevention

Day 1 Morning/Afternoon - Stream 2 – PPTex
Seminar room (Access open to all registered attendees)
Chairman: Ron Sinclair, Technical Manager, SGS Baseefa

11.30 – 12.10: **Trevor Inglis - Business Development Director, Wearable Technologies**
Evolution and Safety for Wearable Technology

12.15 – 12.55: **Matt Cliffe, Technology Lead, Trolex**
Optical Particle Characterisation – new technology for highly accurate particulate identification and monitoring

This will be followed by a product launch lunch in the Aston Room, free for all to attend.

Day 1 Afternoon - Stream 2 – PPTex & Process Safety
Seminar room ***(Access open to all registered attendees)***
Chairman: Ron Sinclair, Technical Manager, SGS Baseefa

14.00 – 14.40: **John Hartley - CEO, Extronics**
Enhanced Worker Safety in Process Industry Environments

14.45 – 15.25: **David Riddle - Europe and Africa Operations Director & Matthew Cutler - Regional Sales Manager, Det-tronics**
The Role of Combustible and Toxic Gas Detectors in Plant Safety

16.00 – 16.40: **Jackson White - UK Sales Director, Getac**
The challenges of deploying mobile devices in a hazardous environment

16.45 – 17.25: **Graeme Ellis - Head of Group Process Safety, Johnson Matthey & Neil Smith - Head of Workforce Development, Cogent Skills**
Process Safety or Managing Major Accident Hazards – What's the difference?

18.00: Exhibition closes

18.30: Drinks

19.30: Evening event & awards dinner

22.30: Drinks

Evening Awards event sponsored by TROLEX

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HAZARDEX & PPTEX 2019 – PROTECTING PLANT, PROCESS & PERSONNEL

Running order subject to change
Check www.hazardexonthenet.net for the latest updates

HAZARDEX CONFERENCE 2019 - DAY 2

8.30 – 9.20: Registration & coffee

Day 2 Morning – Stream 1 – Competence, Functional Safety & Cybersecurity

Main conference room
Chairman: Lee Allford, Energy Institute

9.20 – 9.30: Chairman's introduction

9.30 – 10.10: **Thorsten Arnhold - Chairman, IECEx**
Competence in Hazardous Areas – How the IECEx System can Help

10.15 – 10.55: **Martin Jones - Operations Manager, JTL CompEx**
Reflecting 25 Years of Validating Core Competencies

11.00-11.25: Coffee & exhibition viewing

11.30 – 12.10: **Sarabjit Purewal - Principal Specialist Inspector, HSE**
Managing Cybersecurity and Functional Safety

12.15 – 12.55: **Colin Easton - Principal Safety Consultant, Prosalus**
Security Risk Assessments for Functional Safety

Day 2 Morning - Stream 2 - Investigations & Risks

Seminar room (Access open to all registered attendees)
Chairman: Ron Sinclair, Technical Manager, SGS Baseefa

9.20 – 9.30: **Chairman's introduction**

9.30 – 10.10: **Joe Murphy - Head of Health, Safety, Security and Wellbeing, Southern Water**
Gaining Value from Investigations

10.15 – 10.55: **Paul McCulloch - Risk Management Process Safety & Implementation, CGE**
Barrier-based learning from incidents

11.00 -11.25: Coffee & exhibition viewing

11.30 – 12.10: **Roger Stokes - Principal Engineer, BakerRisk**
Failure to Understand and Manage Risks

12.15 – 12.55: **Harvey T. Dearden - Engineering Director, HTS Engineering Group**
Risk Management & Engineering Judgement

13.00 - 13.55: Lunch

Day 2 Afternoon - Stream 1 – Case Studies & Guidelines

Main conference room
Chairman: Lee Allford, Energy Institute

14.00 – 14.40: **James Jenkins - Principal Consultant, DNV GL**
EI Not Permanently Attended Installation Guidelines

14.45 – 15.25: **Carolyn Nicholls - Director & Process Safety Expert, RAS**
Hazardous Area Classification Chemical Plant Case Study

15.25 - 15.35: Chairman's closing remarks

Day 2 Afternoon - Stream 2 – Practical challenges & solutions

Seminar room
Chairman: Ron Sinclair, Technical Manager, SGS Baseefa

14.00 – 14.40: **Jonathan Hichens - Lead Certification Engineer, CMP Products**
Eliminating Explosion Risks Through Properly Sealed Cables

14.45 – 15.25: **Keith Plumb - Process, Equipment and Safety Consultant, BPE**
Using Equipment Protection Levels to Break the Chain

15.25 - 15.35: Chairman's closing remarks

15.35: Exhibition closes

PPTeX A Hazardex supplement
personnel protection technologies in hazardous area environments

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2019 CONFERENCE PRESENTATION ABSTRACTS

DAY ONE – 27/2/2019

Ken Rivers - President, IChemE, and CoMAH Strategic Forum Chair
2019: The Year of Leadership in Managing Major Hazard Risks

The hazards that can destroy your business should be top of mind right through any organisation and yet they are not. The lack of danger signals means that organisations can get lulled into a false sense of security or simply just not recognise the risks / potential for catastrophe that exits in their activities.

While Great Britain has one of the best records in the world for managing major accident hazards, these incidents are still happening. These risks can be managed and the tool kit is there for businesses to use. Indeed, the CoMAH Strategic Forum, which I chair, has highlighted that making "good practices" into "common practices" is the main challenge to improving standards and raising performance in the UK .

Individual companies do not have a monopoly on good practices and so being open to learning from others is a critical success criteria. Indeed, the lessons from Grenfell have highlighted just how important being open to cross sector learning is. So clearly identifying what is good practice and making it available is important as is improving the consistency of application of these practices across businesses.

However, the most critical activity is reaching out to the currently unengaged and as you might expect, leadership is a vital element in delivering this change and we now have a very clear picture of what good leadership looks like.

Getting leaders interested, curious and committed is critical and 2019 will be the Year of Leadership in Managing Major Hazard Risks where there will be a concerted push from both the Competent Authorities and Industry . What it will mean for you and your company is the focus of this presentation.

Ken Rivers *is President of the Institution of Chemical Engineers (IChemE). He also chairs the UK's Control of Major Hazards (COMAH) Strategic Forum, which is the joint industry/regulator group tasked with raising standards and improving the effectiveness of major hazard legislation.*

Ken's extensive international career included being CEO of Refining NZ and responsibility for Shell's UK refining and petrochemical operations. He is a past President of UK Petroleum Industry Association and chaired the joint industry/regulator task force in the wake of the Buncefield terminal explosion. He was one of the founding members of the New Zealand Business Leaders' Health and Safety Forum. More recently, he chaired the "Midstream Oil Sector Government and Industry Task Force", which considered ways of improving the resilience and viability of the UK refining and fuel import sectors following the recent government review.

Paul Logan - HSE, Head of Chemicals, Explosives and Microbiological Hazards Division
Managing Major Hazard Risks - A Cross-Industry Initiative

(Abstract available on Hazardex website shortly)

Dr Paul Logan *joined the UK Health and Safety Executive (HSE) in 1989 as a scientist, before training as a specialist inspector in the biotechnology and microbiology sector. After this he transferred into a policy role, leading UK negotiations on the GMO contained use directive. He then moved back into operational inspection work, eventually heading the biological agents unit.*

In 2007 he led the Government investigation into an outbreak of foot and mouth disease following an escape from the Pirbright laboratories. Following this he was appointed head of major hazards policy in HSE, and led teams negotiating the Seveso III and offshore oil and gas directives, as well as reform of mines and explosives legislation. After a further spell heading up a wider HSE policy division, he became head of the chemicals, explosives and microbiological hazards division in April 2015.

Brian Cowell - Managing Director, EDF Energy Generation
UK Nuclear Generation - A Decade of Transformation

EDF Energy owns and operates the United Kingdom's eight operational nuclear power stations, providing 9GW of capacity, around 20% of the UK's electricity, from 14 advanced gas cooled reactors (AGR) and one pressurised water reactor (PWR).

Over the last decade the safety and operational performance of EDF Energy's nuclear plants has been transformed. After years of sustained improvement, combined safety and operational results now represent the best overall performance in the past 40 years and are, in many instances, world leading. These reactors are now demonstrably, the safe, reliable "workhorses" of the UK's low carbon electricity sector playing a key role in supporting the UK electricity system.

Brian Cowell, Managing Director of EDF Energy's Generation Business will discuss how this transformation has been achieved and the lessons that could help support the UK's Nuclear Industrial Strategy in the decades to come. He will also cover the evolution of the UK nuclear generation assets as they move towards the end of generation phase into defueling and decommissioning.

Brian Cowell *is Managing Director of EDF Energy's Generation business in the United Kingdom.*

He has responsibility for EDF Energy's nuclear, coal, gas and renewables operations, bringing together under one management team a diverse portfolio of generation assets.

Brian has spent most of his career in nuclear operations having been Station Director of Hunterston and Torness power stations, Chief Nuclear Officer, and was most recently Director of Nuclear Operations before appointment to his current role in 2017.

A Control and Instrumentation Engineer, Brian is a Chartered Engineer and a Fellow of the Institution of Engineering Technology.

Dr Jo Nettleton - Environment Agency Deputy Director, Radioactive Substances & Installations Regulation ***Major Hazards Leadership: Past lessons and future challenges***

Jo will look back over the experiences of her 30 year career, working in and regulating sectors and industries that do great things for individuals, communities, the environment and the economy.... but which, without great leadership, also have the potential to cause great harm. These include healthcare, research, nuclear, chemical and biological industries. There are some great lessons (all too often learned from devastating events) that we ignore at our peril if we are to meet challenges such as EU Exit, climate change and the new political world, as well as to maximise the opportunities presented by government strategies for industry, clean growth, clean air and a thriving environment. This presentation will explore some of those from a personal perspective.

Following a career in medical physics and radiation research, ***Jo Nettleton*** *joined HSE as a radiation specialist inspector, regulating the use of ionising radiations across medicine, research, education and industry and working on related strategy and policy. Jo moved to join the Nuclear Installations Inspectorate, leading teams to regulate nuclear decommissioning (including environmental impact assessment), conventional health and safety and nuclear safeguards, before joining HSE's Hazardous Installations Inspectorate, leading regulation of biological agents, explosives and chemical industries. She joined EA in 2015 and is now Deputy Director and Head of Radioactive Substances and Installations Regulation. Jo lives in Southport and is married with a stepson, daughter and two cats.*

Peter Davidson - Executive Director, Tank Storage Association
Decarbonisation and the Road to Zero

On the 9th July 2018 the UK Government released The Road to Zero – Next steps towards cleaner road transport and delivering our Industrial Strategy. The Downstream Oil Sector recognises the need for decarbonisation and the focus on road transport as a major contributor to this goal. However, the strategy raises several concerns for the sector. This presentation will discuss the challenges for: Terminal Operations and Energy Security; Alternative Fuels; Infrastructure; Fuels Duty

Peter Davidson *is the Executive Director of the Tank Storage Association, representing the interests of over 45 companies who operate around 300 terminals in the UK or provide equipment and services to the sector. Peter is responsible for all aspects of advocacy and lobbying on behalf of the sector, and is also tasked with promoting process safety leadership, helping members achieve excellence in this area and work toward becoming high reliability organisations. Peter works in close collaboration with the UK Government and Regulators and is a leading member of cross-industry committees, Process Safety groups and the Federation of European Tank Storage Associations.*

Prior to joining TSA in April 2016, Peter was the Director of Safety, Commercial and Projects at the UK Petroleum Industry Association and formerly the Regulatory Compliance Manager for ABB Automation in the UK, specialising in the delivery of automation systems to highly regulated industries, including the Oil and Gas, Petrochemical, Pharmaceutical and Nuclear sectors.

Tom Nobes - Process Instruments Capability Leader, Sellafield
Decommissioning at Sellafield - Implications for Control & Instrumentation

The Nuclear Decommissioning Authority owns several site-license companies in the UK. One of them is Sellafield Sites Ltd®. Sellafields' traditional role of reprocessing spent nuclear fuel will cease in 2021. The respective plants then enter POCO (Post Operations Clean Out), decommissioning and waste management. Sellafield is also actively seeking new missions. But what will all this mean for control & instrumentation? What new measurement techniques and information technologies will be required?

Thomas S. Nobes *is Principal Engineer, Process Instruments, at Sellafield Ltd. He is a Chartered Engineer and a Fellow of Engineering with the Institute of Measurement & Control. His first 6 years of working life was at ICI, among other things developing high-level control programmes for DCS systems.*

Tom joined the then named BNFL-Capenhurst in 1980 working on the designs of the uranium centrifuge plants and transferred to the BNFL-Sellafield reprocessing division in 1991. He undertook parts of the design and commissioning of the THORP reprocessing plant which recycled used nuclear fuel. Later he became subject matter expert for process instruments and in particular the adoption of new instrument technologies.

Tom is Capability Leader for Process Instruments, effectivly an internal consultant, owner of the company standards and procedures for process instrument design and is a design auditor for safety assesments. A large part of his role is the promotion and introduction of new technologies within Sellafield. These included HART, ProfiBus, ISA100Wireless and asset management systems. His latest thoughts are on the Industrial Internet Of Things, non-contact measurements and Johnson Noise Thermometry and their application to nuclear decommissioning.

He is a local section committee member for the Institute of Measurement & Control and a member of its national Standards Policy Special Interest Group for instrumentation. He is also a Registered Explosive Atmospheres Engineer via the Institute of Measurement & Controls' R.Ex.E scheme.

Geert Vercruysse - Process Safety Expert, BASF
Lessons Learned from Incidents

Recent incidents in the Benelux region have shown that there is still a strong need to focus on knowhow and competence in Process Safety. Accidents are still happening and these may have been a trigger within your organisation to revalidate existing risk analysis studies and/or start up procedures. Further steps should be taken to reduce the amount and severity of process safety incidents.

The first part of the presentation will highlight the setup of a safety concept for two generic units in a chemical production plant, a batch reactor and a distillation column.

In the second part some new tools, which are still under development, will be presented to support the communication between operations and maintenance. It is the expectation that the number of process safety incidents will drop when these are applied correctly.

Geert Vercruysse *graduated in 1992 from the University of Ghent. He started his career at BASF Antwerp as a production manager for the EB/Styrene plant where he became project manager in 1998 and plant manager in 2001. As of 2004 he became plant manager at the Steamcracker, which is also located on the Antwerp site. In October 2012 he took responsibility for the Butadiene Project as Project Manager. At the moment he is responsible as project coordinator for all Steamcracker related projects at the BASF Antwerp site.*

Since October 2010, Geert has combined his professional activities with the role of guest professor in Process Safety Engineering at KU Leuven where he teaches "Process Safety of Unit Operations" and facilitates the course "Competence in Operations", in cooperation with essenscia.

Terry Cooper - Former Global Head of Integrity & Major Risk Management, Total
Forty Years of Major Hazard Prevention

Terry will pose some challenging questions on the "art of keeping hydrocarbons where they need to be – contained!"

These will include:

- Are Major Accidents as rare as you think they are? In six years, there have been at least 14 major accidents since Macondo, with 137 fatalities.
- Is the UK still a world-class safety leader? Are you aware that in some other parts of the world they have surpassed the UK sector?
- Does the industry focus enough on Process Safety? On average we see a 4+ fatality disaster every 18 months!
- Do companies share "lessons learnt" for the benefit of all? One challenge that we face is overcoming the legal firewall hurdles that limit sharing lessons.
- Are we pushing our Ageing Assets too hard? How far can one go beyond the 'best before date' before calling it a day?"

The introduction of Common Industry Process Safety Fundamentals, alongside the life-saving rules, has the potential of reducing fatal events by 75%.

Terry Cooper's *last position before retirement was Global Head of Integrity & Major Risk Management at Total Exploration & Production, ensuring that major risks are known and managed throughout the organisation's chain of command, from CEO to Operator/Technicians.*

Terry is a chemical engineer by training, with 40 years of experience in the Petrochemicals, Oil and Gas Industries. He started his career in 1979 with Davy McKee International, a design and engineering contractor.

In 1985 he joined Total in Paris specialising in process engineering, following which he moved offshore to the Alwyn North Platform and then became responsible for new business opportunities for the St Fergus gas terminal and southern North Sea assets.

After several assignments overseas on projects and commissioning, Terry returned to Total UK to take on a leadership role as the Alwyn and Dunbar Operations Manager. After a hectic three years Terry became the HSE Director, during which time he started Total's Safety Culture behavioural programme.

Trevor Inglis - Business Development Director, Wearable Technologies
Evolution and Safety for Wearable Technology

The world of Health and Safety is changing faster than anyone could have expected. Expectations are higher, risks are greater, and penalties are more severe than ever.

At the same time, the possibility to monitor environmental conditions both personal and on site is spreading across all sectors. Examples include, noise, location, gas, physiological, proximity warning and Hand Arm Vibration.

The likelihood of mass adoption of this technology will be decided by a few critical factors:

- Data – quality and quantity
- Ease of access to data
- Tangible benefits

Wearable Technologies Limited has developed a sensor agnostic, personal hub coupled with a unique online platform to gather multiple real-time and historical data feeds for improved worker safety and reduced risk.

Trevor Inglis *has over thirty years' experience in the PPE sector working, amongst others, with W.L. Gore & Associates and 3M. During that time, he has developed and taken to market a number of unique garment solutions within the Emergency Services Sector.*

His role within WTL includes supporting the licensed garment manufacturers to integrate electronics into fit for purpose customer clothing.

John Hartley - CEO, Extronics
Enhanced Worker Safety in Process Industry Environments

RTLS (real-time location system) is increasingly used in the process industries to improve worker safety, for example through worker location, automatic mustering, emergency assistance alerts, and security. This paper will look at improvements in RTLS technologies over recent years, and how the growth of complementary technologies - such as Wi-Fi, GPS, BLE, UWB, and RFID access control - has enabled RTLS deployments to demonstrate clear business improvements and higher ROI.

John Hartley *is Managing Director of Extronics Ltd and cut his teeth at Siemens before going on to found Extronics in 1992. He has over 30 years' experience of working in the process industries, especially hazardous areas such as in the oil and gas and chemical sectors. With a technical grounding in automation and instrumentation, wireless networks, and RFID systems including RTLS, John is passionate about innovation and the adoption of modern technologies.*

Matthew Cliffe - Technology Leader, Trolex Ltd
Optical Particle Characterisation – new technology driving real-time, continuous and highly accurate particulate identification and monitoring.

Here we present a new and highly innovative real-time particulate characterisation technology that is IECEx certified for use in Group I explosive environments and general purpose heavy industrial applications. It provides real-time and continuous data regarding the concentration and size makeup of airborne particulate matter. Real-time data enables instant responses to raised particulate levels -from alarms to automated dust suppression systems - and allows for unique trends and patterns to be identified on an unprecedented level, allowing critical process improvements to be made.

This fundamental advancement in technology allows for the collection of data from dust and all other particles with optical diameters from 0.38 µm to 40 µm. All the data relating to the particulate concentration and size profile can be stored and simultaneously displayed according to industry standards such as PM 1, PM 2.5, PM 4.25 (respirable) and PM 10. Additionally, custom size profiles such as top-hat or Gaussian profiles, can be programmed, enabling customisation to process and hazards that are unique to the end-user application.

Matthew Cliffe *is Technology Leader – Particulate Monitoring, at Trolex Ltd. He completed his degree in Physics at the University of Hertfordshire, then moved to Manchester University where he completed his MSc and PhD in Laser Physics.He has worked as a researcher in laser physics at both the University and Government Laboratory in Daresbury and has designed products for the biomedical market. Whilst working for the University and Laser Quantum, he published a book on the physics of laser-matter interactions.*

David Riddle, Europe and Africa Operations Director & Matthew Cutler, Regional Sales Manager, Det-tronics
The Role of Combustible and Toxic Gas Detectors in Plant Safety

There can be confusion between equipment for process gas monitoring and gas detection systems for life safety. Life safety systems mitigate risks stemming from leaks of toxic and/or combustible gases, help prevent explosions and harm to workers caused by leaking gas, and in turn, reduce costly downtime. The paper begins with an overview of the hazardous location standards that impact gas detection needs and product certification requirements. Another consideration for understanding gas detection requirements is the target Safety Integrity Level (SIL).

David Riddle *is the Det-Tronics Sales and Operations Director for Europe and Africa, and has been with the company for 15 years. He has worked in industrial electronics for over 30 years, and has also served on British Standards Committees. David's business and sales experience is extensive, and spans Europe, Russia, Africa, the Middle East and the Americas.*

Matthew Cutler *is Regional Sales Manager, Fire & Security Products at Det-Tronics. He has over 20 years' experience in instrumentation applications and sales, with over 17 years focused in the field of gas detection. He has significant experience with supermajor oil and gas projects, and has been involved in product development programs. He holds a BEng (Hons) in Engineering with Business Studies.*

Jackson White, UK Sales Director, Getac
The challenges of deploying mobile devices in an ATEX environment

An insight into some of the challenges which could be faced, when looking to deploy mobile end-user devices into the field. Currently we are going through the fourth industrial revolution (4IR) with emerging data rich technologies, such as IOT, AI, QC and AV, all of which are rapidly evolving to support organisations in becoming more digitalised. In order to capture, utilise and manipulate data, end-users are relying on feature rich devices to aid them in this

Deploying end-user devices in any enterprise business can be a challenge, however, this challenge is multiplied given the nature of ATEX environments. When deploying mobile devices into such environments, it is imperative to consider factors such as; device format, platform stability, data security and also to ensure that the correct eco-system is being established. During the presentation, Jackson will be sharing his experiences and highlighting some of the significant challenges which end-users may face.

Jackson White *is UK, Ireland & Nordic Sales Director, Getac, and has extensive experience within both the IT and telecoms industry. Having joined Getac in 2014, Jackson has gone on to become a senior figure in developing Getac's sector solutions.*

Graeme Ellis - Group Head of Process Safety, Johnson Matthey & Neil Smith - Head of Workforce Development, Cogent Skills
Improving Process Safety Leadership – A personal journey

After an introduction by Neil, Graeme will share his personal insights on the journey to improve leadership of process safety and the challenges of improving awareness throughout the workforce.

Graeme Ellis *has 37 years' experience in the process manufacturing sector, including 30 years with ICI and ABB Consulting providing support and guidance to industry, before recently joining Johnson Matthey as Group Head of Process Safety.*

A founder member of the PSM Competence Programme Board, ***Neil Smith*** *has taken a leading role in the development of PSM Skills Strategy, supporting the development of the PSM training standards and assuring the programme is supported with the highest quality training provision since the establishment of the PSM programme in 2010. He provides ongoing support to the PSM Competence Programme Board and Expert Panel.*

2019 CONFERENCE
PRESENTATION ABSTRACTS

DAY TWO – 28/2/2019

Thorsten Arnhold - Chairman, IECEx
Competence in Hazardous Areas – How the IECEx System can Help

Investigations show that the overwhelming majority of accidents in hazardous areas are caused by a lack of competence, of clear responsibilities and of commitment. In the presentation, this statement will be illustrated by current accidents in European process plants and I will show how a third-party certification system such as that provided by IECEx can help.

Due to commercial pressures, many companies have reduced the number of in-house safety experts and transferred these obligations to external service providers. This reduces costs and gives some flexibility, but without sufficient internal experts it is very difficult to control the competence and experience of external service providers and of new employees. A Third Party Certification system such as IECEx helps to bridge that gap.

Based on the international standards of the IEC 60079 series, service providers for plant design, equipment selection, installation, inspection, maintenance, repair and overhaul are assessed and certified by independent external experts.

Furthermore the Certification Scheme for personal competency offers an independent evaluation of the knowledge and skills of people who works in hazardous area - both employees of the process companies as well as external service providers. These certificates are available 24/7 on the IECEx homepage, giving responsible persons at end user companies the ability to select the right partners for their safety critical jobs.

Prof. Dr. Thorsten Arnhold *is Chairman of the IECEx System and VP Strategy & Technology at R. STAHL AG. Earlier, he was Chairman of the German National Committee of IECEx and VP Product Management and Marketing at R.STAHL, and before that a Quality Manager for ISO 9000 system implementation.*

He studied electronics at Dresden Technical University and gained a PhD in Hybrid Integrated Circuits, and has a Diploma in Marketing from St. Gallen Business School.

Martin Jones - Operations Manager, CompEx
Reflecting 25 Years of Validating Core Competencies

This Conference Paper will stress the importance of validating core competencies with independently accredited organisations to help protect both the workforce and the expensive capital asset whilst also protecting the Owners and Responsible Persons.

Throughout the development and growth of the CompEx Scheme during the last 25 years, with Industry and Regulator guidance, modules have significantly grown from the original Gas & Vapour suite of modules to a full suite of 14 core competency modules and various Foundation Awareness Modules all of which address the requirements of the international IEC Standard 60079 Parts 14 (Installation) & 17 (Inspection). Additionally, the North American National Electrical Code NEC 500 & 505 Modules and American Petroleum Institute API 500 / 505 Modules were developed specifically for users having assets in the Gulf of Mexico.

Managing this growth and ensuring certification turnaround is maintained is not without its challenges, moving paper-based examinations to online examinations and moving practical assessment recording onto iPad technology presented unique challenges.

The way forward offers new frontiers, the first being Functional Safety Foundation and followed quickly by a core competency module for Functional Safety Technicians against the International Standard for Process Safety IEC 61511, which take CompEx into new frontiers, mapping the proven core competency validation model across into new international standards.

Martin Jones *is Operations Manager at JTL CompEx.He manages the global operations and strategic development of the CompEx Core Competency Scheme for Electrical and Mechanical practitioners and professional Application Design Engineers who work in Explosive Atmospheres.*

Recent achievements are:-

- *Managed the growth of the CompEx Scheme from 10 centres in 2007 to 60 worldwide centres in 2018*
- *Driven the growth of new CompEx Modules to include Foundation, Mechanical, Application Design Engineer and Responsible Person*
- *2010 Achieved Accreditation for the CompEx Scheme to the International Standard IEC/ISO 17024 : 2003 – 'Competency of Persons who work in explosive atmospheres'.*
- *2014 Achieved the updated Accreditation for the CompEx Scheme to the International Standard IEC/ ISO 17024 : 2012 – 'Competency of Persons who work in explosive atmospheres'.*

Sarabjit Purewal - HSE, Principal Specialist Inspector
Managing Cybersecurity and Functional Safety

Cybersecurity is a relatively new topic that industry is becoming familiar with. New standards such as IEC 62443 are at an advanced stage of completion. New guidance is being published by the National Cybersecurity Centre (NCSC) and new regulations such as security of Network Information Systems (NIS) have come on statute in 2018. This presentation will explore the key technical and organisational issues in manging safety systems securely.

Cybersecurity is a relatively new topic that industry is becoming familiar with. New standards such as IEC 62443 are at an advanced stage of completion. New guidance is being published by the National Cybersecurity Centre (NCSC) and new regulations such as security of Network Information Systems (NIS) have come on statute in 2018.

Cybersecurity impacts on many systems that are designed for functional safety where the design methods do not assume that someone is deliberately trying to introduce malware into the systems. So what are the issues around managing safety systems from a cybersecurity perspective?

Other than the issues in managing safety systems securely, the presentation will also explore technical issues around risk assessments, risk appetite, and managing cybersecurity including supply chain to organisational issues of leadership, and competency.

Sarabjit Purewal *leads an electrical, control and cybersecurity team in the onshore major hazards section of the Health and Safety Executive (HSE). He is a chartered engineer, an associate of City and Guilds Institute, and member of the Institution of Engineering and Technology. Sarabjit started his career with the CEGB in the electricity supply industry working on automation of conventional and nuclear power stations.*

He later worked with Kennedy and Donkin Consulting Engineers as the engineering manager of the Power Group, and then with Mott MacDonald as divisional director, before moving to the Health and Safety Executive working on various technical and policy issues.

Colin Easton - Principal Safety Consultant, Prosalus
Security Risk Assessments for Functional Safety

Safety Instrumented Systems (SIS) are more vulnerable today than ever before due to the prevalence and sophistication of attacks specifically targeting them. Although these attacks may be initially intended to hold a business to ransom by denial of service, the resultant consequences can be catastrophic, leading to a failure or unpredictable operation of the SIS resulting in a safety or environmental incident. These vulnerabilities are not just as a result of the availability of commercial off-the-shelf technology; high connectivity to business and manufacturing enterprise systems; requirements for remote access and availability of OEM system data in the public domain, but can also be related to the training and awareness of a business' core staff.

BS EN 61511:2017 2 nd Edition and the UK HSE Operational Guidance OG-00086 introduce requirements for all owners of process safety systems to carry out a security risk assessment (SRA) to identify these threats. However, the security standards and practices for industrial automation and control systems continue to evolve while the process industry is struggling to keep abreast of the changing threat and regulatory landscape. In addition, the plethora of standards, guidance and articles being published to help address the SRA requirement has resulted in information overload.

This presentation will break down the requirements of BS EN 61511:2017 2 nd Edition in the context of IEC, ISA, API and NIST requirements. It will also provide a practical methodology for meeting the requirements of BS EN 61511:2017 2 nd Edition to be able to satisfactorily demonstrate to the regulatory authorities that the risks from security breaches have been reduced to a level that can be considered ALARP.

Colin Easton *is a Principal Safety Consultant at ProSalus Limited and has over 30 years of safety related experience as well as an international reputation for the provision of consultancy and training services, predominantly in the process industry sector, assisting clients to meet their safety, legislative, and regulatory obligations.*

His main areas of specialisation are delivering safety training, the Functional Safety Assessment, Verification and validation of new and legacy plant safety systems, facilitation of safety studies, quantitative risk analysis and developing functional safety management systems including gap analysis

He has an MSc Eng. in Process Safety & Loss Prevention from the University of Sheffield, is an accredited TÜV Rheinland Functional Safety Senior Expert and a member of the Institute of Measurement and Control Safety Panel.

Joe Murphy - Head of Health, Safety, Security and Wellbeing, Southern Water
Gaining Value from Investigations

Accidents in the workplace are never welcome, but rather than being something to brush under the carpet, these incidents offer businesses the chance to improve and right wrongs for the future. Key to this is ensuring that investigations can be carried out thoroughly and accurately, the groundwork for which can be laid within the culture of an organisation.

This involves asking tough questions, digging deep into the events leading up to the incident, creating a blame-free environment and ensuring there is the right culture within the organisation to ensure a free flow of information.

Joe Murphy *is Head of Health, Safety, Security and Wellbeing at Southern Water. Prior to that he was Head of Health, Safety and Security - Area South - at High Speed Two (HS2) Ltd for over five years, Managing Director of a risk compliance consultancy, HSEQ Manager at Morrison Utility Services and has extensive work experience in both the rail and water industry sectors.*

He also developed a training facility for Thames Water and network partners.

Paul McCulloch - Risk Management Process Safety & Implementation, CGE
Barrier-based learning from incidents

By mapping barrier performance from an incident on a BowTie assessment allows an organisation to lock learning into corporate memory, and over time as more and more incidents get mapped to the BowTie, an organisation builds up a profile of positive and negative performance of their barriers from their incidents. By establishing a connection of barrier performance to risk management BowTies, an organisation has a picture of real barrier performance against its proactive risk assessments and can take corrective action.

Paul McCulloch *is a Risk Management Process Safety & Implementation Consultant at CGE Risk Management Solutions working on the implementation of BowTie risk management programs.*

Previously he worked within E.ON Next Generation business as a Process Safety Specialist and was the chief architect of E.ON's award winning Process Safety project using BowTies and BowTie Server from CGE.

Before joining E.ON, Paul spent four years as a process safety specialist with ABB Engineering Services delivering solutions to their clients in Petrochemical/Oil & Gas/Power and Speciality Chemical industries. Key focus was technical process safety - consequence modelling, ALARP assessment, SIL assessment a nd Hazard Study leadership.

Roger Stokes - Principal Engineer, BakerRisk
Failure to Understand and Manage Risks

This paper presents a case study of an incident that occurred outside the traditional area of process safety, although the circumstances and the learnings are highly relevant to the high hazard process industries. Key areas of failure include leadership, accountability, risk assessment, following established procedures, management of change, consideration of off-site impacts, and emergency procedures. Organisational issues associated with culture and whistleblowing also played a key role in the incident.

***Roger Stokes** joined BakerRisk in 2015 and is Principal Engineer in the Process Safety Group, where his main focus is on incident investigation and insurance risk engineering. After graduating as a chemical engineer he took a position in ICI's Mond Division, ending up as a plant manager. Later, he joined a firm of Loss Adjusters dealing with commercial insurance claims including fires, explosions and machinery breakdown on chemical, food processing and other manufacturing facilities.*

Harvey T. Dearden - Engineering Director, HTS Engineering Group
Risk Management & Engineering Judgement: 4 Shades of Grey

The effective exercising of engineering judgement may be identified as one of the hallmarks of the true professional engineer. But in embracing this notion, there is perhaps a danger that individual engineers may become over eager to exercise their judgement in demonstration of their professionalism. We may identify a further hallmark as an awareness of this danger and the recognition of the need to guard against it. The all too human traps of arrogance and hubris are set to ensnare us. We need to exercise appropriate meta-judgement; judgement about judgements.

Our primary defence must be an awareness of this situation, and in this regard, it may be useful to consider the 'space' within which engineering judgement is exercised by the individual engineer.

This presentation identifies the dimensions that characterise this space and the degree to which engineers should validate their judgements and how they might do this. (The '4 shades' refers to the distinct areas by which the space is characterised.)

It considers the responsibilities and liabilities placed upon the professional engineer and the apparent reluctance shown by many ostensibly competent engineers to exercise judgement and asks from what this may spring? The 'case for the prosecution' is also considered.

It also considers the relevance of rigour and uncertainty in the evaluations that should inform our judgements.

***Harvey T. Dearden** BSc CEng is FS Expert TUV Rheinland 188/12, InstMC Registered Functional Safety Engineer 16/003, a Professional Process Safety Engineer (IChemE), and the author of 'Functional Safety In Practice' and 'Professional Engineering Practice'.*

James Jenkins - Principal Consultant, DNV GL
EI Not Permanently Attended Installation Guidelines

In June 2010 the Energy Institute issued the first edition of the Not Permanently Attended Installation (NPAI) guidelines. The document sought to provide best practice guidance on issues of safety, welfare and the environment consistent with optimising the benefits of NPAI's for the international petroleum industry. The EI and DNV GL have recently revised the NPAI Guidelines to more accurately reflect current international best practice.

The topics that a presentation will cover are:

- Design of remotely operated installations;
- Transition from normally manned to remotely operated installations (and vice-versa); and
- Operation of remotely operated installations.

Each topic will look at several key themes that are important to consider with remote operations including: staffing demand versus the productive hours; benefit of safety systems versus the risk exposure associated with maintaining them; simplification/minimisation whilst providing adequate welfare provision; safety management; environmental aspects; reliability/availability; maintenance strategies; asset integrity; changing production profiles; and legislative compliance.

With over 100 NPAI's and numerous NPAI operators within the UK Continental Shelf, the NPAI guidelines are a distillation of the learning from these operations which attendees should find informative, insightful and useful.

***James Jenkins** is a Safety Engineering Consultant with thirteen years' experience in a wide range of process industries. James is a Principal Consultant within DNV GL Manchester Advisory, and has been significantly involved in projects for the offshore oil and gas industry, as well as the LNG, gas transmission and food & beverage sectors.*

He has worked extensively on consultancy projects which establish risk management frameworks, assess risks in operation, support regulatory compliance activities and assessment of major accident management activities. He has participated in due diligence projects both on behalf of sellers and prospective buyers.

James is a primary author of the OGUK guidelines for NUI helideck Fire Fighting Equipment and the Energy Institute's NPAI guidelines (2nd Edition).

Carolyn Nicholls - Director & Process Safety Expert, RAS
Hazardous Area Classification Chemical Plant Case Study

It is important that care is taken when determining hazardous zones. The consequences of applying the wrong technique are clear: hazards can be underestimated and inadequately controlled, or can be overestimated resulting in resource expenditure and prioritisation in the wrong places. In this paper, Carolyn Nicholls RAS Ltd. explains the methods that have been used to overcome this challenge using a case study from a chemical manufacturing site currently revising their hazardous area classification, which considers both gaseous and liquid releases.

Workplaces that handle dangerous substances with the potential to form an explosive atmosphere fall under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). These regulations require workplaces to be classified into hazardous and non-hazardous areas, with the aim of ensuring potential ignition sources are properly controlled so as to reduce the risk of workers to as low as reasonably practicable.

The regulations do not provide a methodology for how to classify these zones. As a result, a number of organisations have developed their own methodologies to do this, the most notable of these being the British Standards Institute and the Energy Institute.

For accidental releases, both the British Standard and Energy Institute methodology follow the same core steps:

1. Select an appropriate hole size.
2. Estimate the size of the LFL cloud from that hole size.

In this paper, RAS Ltd. explain the methods that have been used to overcome this challenge using a case study from a chemical manufacturing site currently revising their hazardous area classification, which considers both gaseous and liquid releases. In summary, the key findings and method include:

- Use of both point source and risk-based approaches provided in the Energy Institute methodology in combination to determine the hole size for releases.
- Use of dispersion modelling inputs provided in the Energy Institute methodology.
- Use of surrogate materials that are selected based on similar key material properties justified by comparison of consequence modelling results.
- Identifying the key assumptions for modelling liquid pool diameters.

***Carolyn Nicholls** is a process safety specialist and a Director of RAS Limited, with more than 10 years' experience of the risk and hazard management industry. She has worked with a number of UK COMAH sites to develop safety reports and provide support in all aspects of risk management.*

She leads the RAS teams of risk and hazard management consultants and has been instrumental in creating the company's assessment methodologies. Her particular area of interest is the demonstration of ALARP, an often misunderstood concept.

Jonathan Hichens - Lead Certification Engineer, CMP Products
Eliminating Explosion Risks Through Properly Sealed Cables

This report was commissioned in order to establish the correct type of cable gland for a particular type of cable construction when used in Zone 1 and Zone 2 hazardous areas. This resulted into an investigation and testing program to establish if selecting cable glands using the guidance from IEC 60079-14 Electrical installations design, selection and erection - is in fact safe for flameproof applications using cables typically used in marine and offshore.

Several varied cable/cable gland assemblies were put through the following tests to collect data on how non-barrier cable glands, employing an elastomeric sealing ring, performed in the prevention of flame transmission and gas migration under test conditions:

- Test 1: Flame non-transmission of an internal ignition. IEC 60079-1:2014 Cl 15.4.4
- Test 2: Restricted breathing test. IEC 60079-14:2013 Annex E (Informative)
- Test 3: Gas migration test (Bespoke)

These test results were then assessed against the requirements of the installation standard (IEC 60079-14), and the standard itself is examined for its potentially dangerous guidance on the selection of cable glands. For example in the clause 9.3.2 of this edition 5.0, when it states "where there is a likelihood that gas or vapour migration may occur through the interstices between individual cores of a cable, and the cable leads to a non-hazardous area or between zones, then the construction and application of the cable shall be taken into account." This can be seen as an attempt to pass the responsibility onto end users to use "good engineering practice" and assess each case independently. It is thought however, that this has the opposite effect and is in fact conducive of "bad engineering practice".

The results of the investigation show that the selection criteria detailed in the IEC-60079-14:2013 (edition 5.0) installation standard, allows for situations where non-barrier type cable glands can be used with unsuitable cables for various applications, and how the standard could be improved to promote safer selection of cable glands for flammable atmospheres.

***Jonathan Hichens** is Lead Certification Engineer for CMP Products Ltd, a market leader of cable glands, cable cleats and accessories. He has been with CMP for over two years where he oversees the team responsible for testing and certification of a portfolio of products for industrial and hazardous applications.*

Prior to working at CMP Products he spent several years as a project engineer and project manager for a bespoke fluid handling systems OEM, primarily for hazardous locations applications, and before that was an Aircraft Mechanic in the Royal Air Force.

Keith Plumb - Process, Equipment and Safety Consultant BPE
Using Equipment Protection Levels to Break the Chain

It is clear that a hazardous area classification plus equipment selection does not constitute a complete risk assessment because an assessment of the consequences is not included. EN IEC 60079-10-1 reflects this and states," Subsequent to the completion of the area classification, a risk assessment may be carried out….". It then goes on to suggest that as a result of the risk assessment the required EPL may be higher or lower than normal.

In the UK the requirements are mandatory because the Dangerous Substances and Explosive Atmospheres Regulations require a risk assessment to be carried out and that risk assessment needs to include "the scale of the anticipated effects of a ?re or an explosion".

Carrying out such a risk assessment allows the chain: grade of release leading directly to a hazardous zone directly leading to an EPL to be broken. Which means that a number of scenarios can be considered e.g. unusually high consequences or unusually low consequences (resulting from a small scale, for example), which in turn can result in changes to the EPLs selected for equipment to be used in the designated hazardous zones.

Another area where breaking the chain can be advantageous is in respect of blanket zoning which is frequently used to allow future proofing and potentially a simpler operating and maintenance regime.

This paper presents practical examples of breaking the chain when the consequences of an explosion would be high or low and when blanket zoning is advantageous.

***Keith Plumb** is Process and Equipment Consultant at BPE Design and Support Ltd. He is on the Pharma Special Interest Group and Board of Trustees at IChemE and Visiting Lecturer at the University of Chester covering Food and Pharmaceutical Engineering.*

He has more than 40 years' experience in the pharmaceutical, biopharmaceutical, fine chemical and allied process industries. His experience covers multinational manufacturing companies, engineering design companies and consultancies.

Keith's specialties are: Dust explosion risk reduction; Dust hazardous area classification; ATEX and non-electrical equipment; Safety of machinery in the process industries and Process mechanical design for pressure equipment.

1. Keynote - The Year of Leadership in Managing Major Hazard Risks

Wednesday 9.30 – 10.10 - Main conference room

Ken Rivers - President, IChemE

***Ken Rivers** is President of the Institution of Chemical Engineers (IChemE). He also chairs the UK's Control of Major Hazards (COMAH) Strategic Forum, which is the joint industry/regulator group tasked with raising standards and improving the effectiveness of major hazard legislation.*

Ken's extensive international career included being CEO of Refining NZ and responsibility for Shell's UK refining and petrochemical operations. He is a past President of UK Petroleum Industry Association and chaired the joint industry/regulator task force in the wake of the Buncefield terminal explosion. He was one of the founding members of the New Zealand Business Leaders' Health and Safety Forum.

More recently, he chaired the "Midstream Oil Sector Government and Industry Task Force", which considered ways of improving the resilience and viability of the UK refining and fuel import sectors following the recent government review.

The hazards that can destroy your business should be top of mind right through any organisation and yet they are not. The lack of danger signals means that organisations can get lulled into a false sense of security or simply just not recognise the risks / potential for catastrophe that exits in their activities.

While Great Britain has one of the best records in the world for managing major accident hazards, these incidents are still happening. These risks can be managed and the tool kit is there for businesses to use. Indeed, the COMAH Strategic Forum, which I chair, has highlighted that making "good practices" into "common practices" is the main challenge to improving standards and raising performance in the UK .

Individual companies do not have a monopoly on good practices and so being open to learning from others is a critical success criteria. Indeed, the lessons from Grenfell have highlighted just how important being open to cross sector learning is. So clearly identifying what is good practice and making it available is important as is improving the consistency of application of these practices across businesses.

However, the most critical activity is reaching out to the currently unengaged and as you might expect, leadership is a vital element in delivering this change and we now have a very clear picture of what good leadership looks like.

Getting leaders interested, curious and committed is critical and 2019 will be the Year of Leadership in Managing Major Hazard Risks where there will be a concerted push from both the Competent Authorities and Industry. What it will mean for you and your company is the focus of this presentation.

2. Keynote - Managing Major Hazard Risks - A Cross-Industry Initiative

Wednesday 10.15 – 10.55 - Main conference room

Paul Logan - HSE, Head of Chemicals, Explosives and Microbiological Hazards

Dr Paul Logan *joined the UK Health and Safety Executive (HSE) in 1989 as a scientist, before training as a specialist inspector in the biotechnology and microbiology sector. After this he transferred into a policy role, leading UK negotiations on the GMO contained use directive. He then moved back into operational inspection work, eventually heading the biological agents unit.*

In 2007 he led the Government investigation into an outbreak of foot and mouth disease following an escape from the Pirbright laboratories. Following this he was appointed head of major hazards policy in HSE, and led teams negotiating the Seveso III and offshore oil and gas directives, as well as reform of mines and explosives legislation. After a further spell heading up a wider HSE policy division, he became head of the chemicals, explosives and microbiological hazards division in April 2015.

Great Britain has many highly specialised, strategically important industries which are essential to the country's economy and social infrastructure, but can potentially cause great harm to their workers, the environment, the public and critical national infrastructure if not properly managed.

In all these sectors, a single incident can have catastrophic consequences and has the potential to undermine whole sectors by eroding the public's trust and acceptance of complex, high-hazard activities, especially those near to communities.

Our 2019/20 corporate business plan will include, as part of HSE's regulatory work to reduce the likelihood of low frequency, high impact catastrophic events, a specific focus on cyber security risk management and the wider topic of leadership.

As part of the Year of Leadership in Managing Major Hazard Risks, the HSE, in collaboration with the environment agencies in England, Scotland and Wales, is developing an inspection guide for inspectors to target and assess leadership at COMAH sites.

The presentation will outline the approach HSE will be taking to targeting this issue during 2019.

3. UK Nuclear Generation - A Decade of Transformation

Wednesday 11.30 – 12.10 - Main conference room

Brian Cowell - Managing Director, EDF Energy Generation

***Brian Cowell** is Managing Director of EDF Energy's Generation business in the United Kingdom.*

He has responsibility for EDF Energy's nuclear, coal, gas and renewables operations, bringing together under one management team a diverse portfolio of generation assets.

Brian has spent most of his career in nuclear operations having been Station Director of Hunterston and Torness power stations, Chief Nuclear Officer, and was most recently Director of Nuclear Operations before appointment to his current role in 2017.

A Control and Instrumentation Engineer, Brian is a Chartered Engineer and a Fellow of the Institution of Engineering Technology.

EDF Energy owns and operates the United Kingdom's eight operational nuclear power stations, providing 9GW of capacity, around 20% of the UK's electricity, from 14 advanced gas cooled reactors (AGR) and one pressurised water reactor (PWR).

Over the last decade the safety and operational performance of EDF Energy's nuclear plants has been transformed. After years of sustained improvement, combined safety and operational results now represent the best overall performance in the past 40 years and are, in many instances, world leading. These reactors are now demonstrably, the safe, reliable "workhorses" of the UK's low carbon electricity sector playing a key role in supporting the UK electricity system.

Brian Cowell, Managing Director of EDF Energy's Generation Business will discuss how this transformation has been achieved and the lessons that could help support the UK's Nuclear Industrial Strategy in the decades to come. He will also cover the evolution of the UK nuclear generation assets as they move towards the end of generation phase into defueling and decommissioning.

4. Major Hazards Leadership: Past lessons and future challenges

Wednesday 12.15 – 12.55 - Main conference room

Dr Jo Nettleton - Deputy Director, Radioactive Substances & Installations Regulation, Environment Agency

Following a career in medical physics and radiation research, ***Jo Nettleton*** *joined HSE as a radiation specialist inspector, regulating the use of ionising radiations across medicine, research, education and industry and working on related strategy and policy. Jo moved to join the Nuclear Installations Inspectorate, leading teams to regulate nuclear decommissioning (including environmental impact assessment), conventional health and safety and nuclear safeguards, before joining HSE's Hazardous Installations Inspectorate, leading regulation of biological agents, explosives and chemical industries.*

She joined EA in 2015 and is now Deputy Director and Head of Radioactive Substances and Installations Regulation.

Jo will look back over the experiences of her 30 year career, working in and regulating sectors and industries that do great things for individuals, communities, the environment and the economy....but which, without great leadership, also have the potential to cause great harm. These include healthcare, research, nuclear, chemical and biological industries.

There are some great lessons (all too often learned from devastating events) that we ignore at our peril if we are to meet challenges such as Brexit, climate change and the new political world, as well as to maximise the opportunities presented by government strategies for industry, clean growth, clean air and a thriving environment. This presentation will explore some of those from a personal perspective.

5. Decarbonisation and the Road to Zero

Wednesday 14.00 – 14.40 - Main conference room

Peter Davidson - Executive Director, Tank Storage Association

Peter Davidson *is the Executive Director of the Tank Storage Association, representing the interests of over 45 companies which operate around 300 terminals in the UK or provide equipment and services to the sector. Peter is responsible for all aspects of advocacy and lobbying on behalf of the sector, and is also tasked with promoting process safety leadership, helping members achieve excellence in this area and work toward becoming high reliability organisations. Peter works in close collaboration with the UK Government and Regulators and is a leading member of cross-industry committees, Process Safety groups and the Federation of European Tank Storage Associations.*

Prior to joining TSA in April 2016, Peter was the Director of Safety, Commercial and Projects at the UK Petroleum Industry Association and formerly the Regulatory Compliance Manager for ABB Automation in the UK, specialising in the delivery of automation systems to highly regulated industries, including the Oil and Gas, Petrochemical, Pharmaceutical and Nuclear sectors.

On the 9th July 2018 the UK Government released The Road to Zero – Next steps towards cleaner road transport and delivering our Industrial Strategy. The Downstream Oil Sector recognises the need for decarbonisation and the focus on road transport as a major contributor to this goal. However, the strategy raises several concerns for the sector. This presentation will discuss the challenges for: Terminal Operations and Energy Security; Alternative Fuels; Infrastructure; and Fuels Duty.

6. Decommissioning at Sellafield - Implications for Control & Instrumentation

Wednesday 14.45 – 15.25 - Main conference room

Tom Nobes - Process Instruments Capability Leader, Sellafield

Thomas S. Nobes *is Principal Engineer, Process Instruments, at Sellafield Ltd. He is a Chartered Engineer and a Fellow of Engineering with the Institute of Measurement & Control. His first 6 years of working life was at ICI, among other things developing high-level control programmes for DCS systems.*

Tom joined the then named BNFL-Capenhurst in 1980 working on the designs of the uranium centrifuge plants and transferred to the BNFL-Sellafield reprocessing division in 1991. He undertook parts of the design and commissioning of the THORP reprocessing plant which recycled used nuclear fuel. Later he became subject matter expert for process instruments and in particular the adoption of new instrument technologies.

Tom is Capability Leader for Process Instruments, effectively an internal consultant, owner of the company standards and procedures for process instrument design and is a design auditor for safety assesments. A large part of his role is the promotion and introduction of new technologies within Sellafield. These included HART, ProfiBus, ISA100Wireless and asset management systems. His latest thoughts are on the Industrial Internet Of Things, non-contact measurements and Johnson Noise Thermometry and their application to nuclear decommissioning.

The Nuclear Decommissioning Authority owns several site-license companies in the UK. One of them is Sellafield Sites Ltd. Sellafield's traditional role of reprocessing spent nuclear fuel will cease in 2021. The respective plants then enter POCO (Post Operations Clean Out), decommissioning and waste management. Sellafield is also actively seeking new missions. But what will all this mean for control and instrumentation? What new measurement techniques and information technologies will be required?

7. Lessons Learned from Incidents

Wednesday 16.00 – 16.40 - Main conference room

Geert Vercruysse - Process Safety Expert, BASF

Geert Vercruysse *graduated in 1992 from the University of Ghent. He started his career at BASF Antwerp as a production manager for the EB/Styrene plant where he became project manager in 1998 and plant manager in 2001. As of 2004 he became plant manager at the Steamcracker, which is also located on the Antwerp site. In October 2012 he took responsibility for the Butadiene Project as Project Manager. At the moment he is responsible as project coordinator for all Steamcracker related projects at the BASF Antwerp site.*

Since October 2010, Geert has combined his professional activities with the role of guest professor in Process Safety Engineering at KU Leuven where he teaches "Process Safety of Unit Operations" and facilitates the course "Competence in Operations", in cooperation with essenscia.

Recent incidents in the Benelux region have shown that there is still a strong need to focus on knowhow and competence in Process Safety. Accidents are still happening and these may have been a trigger within your organisation to revalidate existing risk analysis studies and/or start up procedures. Further steps should be taken to reduce the amount and severity of process safety incidents.

The first part of the presentation will highlight the setup of a safety concept for two generic units in a chemical production plant, a batch reactor and a distillation column.

In the second part some new tools, which are still under development, will be presented to support the communication between operations and maintenance. It is the expectation that the number of process safety incidents will drop when these are applied correctly.

8. Closing keynote - Forty Years of Major Hazard Prevention

Wednesday 16.45 – 17.25 - Main conference room

Terry Cooper - Former Global Head of Integrity & Major Risk Management, Total

Terry Cooper's *last position before retirement was Global Head of Integrity & Major Risk Management at Total Exploration & Production, ensuring that major risks are known and managed throughout the organisation's chain of command, from CEO to Operator/Technicians.*

Terry is a chemical engineer by training, with 40 years of experience in the Petrochemicals, Oil and Gas Industries. He started his career in 1979 with Davy McKee International, a design and engineering contractor.

In 1985 he joined Total in Paris specialising in process engineering, following which he moved offshore to the Alwyn North Platform and then became responsible for new business opportunities for the St Fergus gas terminal and southern North Sea assets.

After several assignments overseas on projects and commissioning, Terry returned to Total UK to take on a leadership role as the Alwyn and Dunbar Operations Manager. After a hectic three years Terry became the HSE Director, during which time he started Total's Safety Culture behavioural programme.

In 2007 he moved to Kazakhstan, as Production and Maintenance Director for the giant Kashagan project

Terry will pose some challenging questions on the "art of keeping hydrocarbons where they need to be – contained!"

These will include:

- Are Major Accidents as rare as you think they are? In six years, there have been at least 14 major accidents since Macondo, with 137 fatalities.
- Is the UK still a world-class safety leader? Are you aware that in some other parts of the world they have surpassed the UK sector?
- Does the industry focus enough on Process Safety? On average we see a 4+ fatality disaster every 18 months!
- Do companies share "lessons learnt" for the benefit of all? One challenge that we face is overcoming the legal firewall hurdles that limit sharing lessons.
- Are we pushing our Ageing Assets too hard? How far can one go beyond the 'best before date' before calling it a day?"

The introduction of Common Industry Process Safety Fundamentals, alongside the life-saving rules, has the potential of reducing fatal events by 75%.

9. Evolution and Safety for Wearable Technology
Wednesday 11.30 – 12.10 - Seminar room

Trevor Inglis - Business Development Director, Wearable Technologies

Trevor Inglis *has over thirty years' experience in the PPE sector working amongst others, W.L. Gore & Associates and 3M. During that time, he has developed and taken to market a number of unique garment solutions within the Emergency Services Sector.*

His role within WTL includes supporting the licensed garment manufacturers to integrate electronics into fit-for-purpose customer clothing.

The world of Health and Safety is changing faster than anyone could have expected. Expectations are higher, risks are greater, and penalties are more severe than ever.

At the same time, the possibility to monitor environmental conditions both personal and on site is spreading across all sectors. Examples include, noise, location, gas, physiological, proximity warning and Hand Arm Vibration.

The likelihood of mass adoption of this technology will be decided by a few critical factors:
- Data – quality and quantity
- Ease of access to data
- Tangible benefits

Wearable Technologies Limited has developed a sensor agnostic, personal hub coupled with a unique online platform to gather multiple real-time and historical data feeds for improved worker safety and reduce risk.

10. Optical Particle Characterisation: new technology driving real-time, continuous and highly accurate particulate identification and monitoring

Wednesday 12.15 – 12.55 - Seminar room

Matthew Cliffe - Technology Lead, Trolex

In this Sponsor Presentation, ***Matthew Cliffe*** *of Trolex will present a new and highly innovative real-time particulate characterisation technology that is IECEx certified for use in Group I explosive environments and general purpose heavy industrial applications. It provides real-time and continuous data regarding the concentration and size makeup of airborne particulate matter.*

Real-time data enables instant responses to raised particulate levels -from alarms to automated dust suppression systems - and allows for unique trends and patterns to be identified on an unprecedented level, allowing critical process improvements to be made.

This fundamental advancement in technology allows for the collection of data from dust and all other particles with optical diameters from 0.38 to 0.40 micrometres. All the data relating to the particulate concentration and size profile can be stored and simultaneously displayed according to industry standards such as PM 1, PM 2.5, PM 4.25 (respirable) and PM 10.

Additionally, custom size profiles such as top-hat or Gaussian profiles, can be programmed, enabling customisation to process and hazards that are unique to the end-user application.

This new technological approach does not calculate the particle size based on any hardware-based filtration systems and as such it can be reconfigured to display any particle size fraction within its detection range purely from software. It also allows for the removal of all pumps and filters from the process, and the flow rate of the particulate matter is not assumed.

Instead the flow rate is calculated on a particle to particle basis constantly re-adjusting the calculation to reflect an ever-changing and challenging environment. This produces far more accurate, reliable and robust results and prevents under or over-sampling.

Due to the lack of filters or pumps this new particle characterisation technology does not require regular maintenance or calibration in the field, and the accuracy of the results does not degrade over time. To enable the most accurate readings the technology can be tuned, either in the factory or in the field, for different environments using a database built up to reflect a wide range of harsh and demanding applications.

The new technology is a development of previous light-scattering technologies allowing any device using the technology to not only count but also dynamically size the particulates. An advanced multi-photodiode structure is used to not only capture the basic particle size data but also the particle time of fight. This new information combined with the particulates size can be used to generate more accurate data and, as previously stated, remove the requirement for pumps and filters.

Please join Trolex for a Product Launch Luncheon in the Aston Room (next to the PPTex seminar room) immediately after this presentation.

11. Enhanced Worker Safety in Process Industry Environments

Wednesday 14.00 – 14.40 - Seminar room

John Hartley - CEO, Extronics

***John Hartley** is Managing Director of Extronics Ltd and cut his teeth at Siemens before going on to found Extronics in 1992. He has over 30 years' experience of working in the process industries, especially hazardous areas such as in the oil and gas and chemical sectors. With a technical grounding in automation and instrumentation, wireless networks, and RFID systems including RTLS, John is passionate about innovation and the adoption of modern technologies.*

RTLS (real-time location system) is increasingly used in the process industries to improve worker safety, for example through worker location, automatic mustering, emergency assistance alerts, and security. This paper will look at improvements in RTLS technologies over recent years, and how the growth of complementary technologies - such as Wi-Fi, GPS, BLE, UWB, and RFID access control - has enabled RTLS deployments to demonstrate clear business improvements and higher ROI.

12. The Role of Combustible and Toxic Gas Detectors in Plant Safety

Wednesday 14.45 – 15.25 - Seminar room

David Riddle - Europe and Africa Operations Director & Matthew Cutler - Regional Sales Manager, Det-tronics

David Riddle *is the Det-Tronics Sales and Operations Director for Europe and Africa, and has been with the company for 15 years. He has worked in industrial electronics for over 30 years, and has also served on British Standards Committees. David's business and sales experience is extensive, and spans Europe, Russia, Africa, the Middle East and the Americas.*

Matthew Cutler *is Regional Sales Manager, Fire & Security Products at Det-Tronics. He has over 20 years' experience in instrumentation applications and sales, with over 17 years focused in the field of gas detection. He has significant experience with supermajor oil and gas projects, and has been involved in product development programs. He holds a BEng (Hons) in Engineering with Business Studies.*

There can be confusion between equipment for process gas monitoring and gas detection systems for life safety. Life safety systems mitigate risks stemming from leaks of toxic and/or combustible gases, help prevent explosions and harm to workers caused by leaking gas, and in turn, reduce costly downtime. The paper begins with an overview of the hazardous location standards that impact gas detection needs and product certification requirements. Another consideration for understanding gas detection requirements is the target Safety Integrity Level (SIL).

13. The challenges of deploying mobile devices in a hazardous environment

Wednesday 16.00 – 16.40 - Seminar room

Jackson White, UK Director, Getac

***Jackson White** has extensive experience within both the IT and telecoms industry. Having joined Getac in 2014, Jackson has gone on to become a senior figure in developing Getac's sector solutions. With an in-depth understanding of deploying mobile technology in field environments. Jackson's knowledge and understanding has aided him not just in the supply of technology, but also in contributing towards future innovations across multiple industries.*

This presentation gives an insight into some of the challenges that could be faced, when looking to deploy mobile end-user devices into the field. Currently we are going through the fourth industrial revolution (4IR) with emerging data rich technologies, such as IOT, AI, QC and AV, all of which are rapidly evolving to support organisations in becoming more digitalised. In order to capture, utilise and manipulate data, end-users are relying on feature-rich devices to aid them in this

Deploying end-user devices in any enterprise business can be a challenge, however, this challenge is multiplied given the nature of ATEX environments. When deploying mobile devices into such environments, it is imperative to consider factors such as; device format, platform stability, data security and also to ensure that the correct eco-system is being established. During the presentation, Jackson will be sharing his experiences and highlighting some of the significant challenges which end-users may face.

14. Improving Process Safety Leadership – A personal journey

Wednesday 16.40 – 17.35 - Seminar room

Graeme Ellis - Group Head of Process Safety, Johnson Matthey & Neil Smith - Head of Workforce Development, Cogent Skills

Graeme Ellis *has 37 years' experience in the process manufacturing sector, including 30 years with ICI and ABB Consulting providing support and guidance to industry, before recently joining Johnson Matthey as Group Head of Process Safety.*

In 2010 Graeme worked with Cogent Skills and industry stakeholders to develop the highly respected PSM Training Standards, including Process Safety Leadership for Senior Executives. He has been involved both in delivering the associated training, and now working with colleagues to embed a bespoke approach to process safety leadership training across Johnson Matthey's global operations.

A founder member of the PSM Competence Programme Board, ***Neil Smith*** *has taken a leading role in the development of PSM Skills Strategy, supporting the development of the PSM training standards and assuring the programme is supported with the highest quality training provision since the establishment of the PSM programme in 2010. He provides ongoing support to the PSM Competence Programme Board and Expert Panel.*

In addition to over 20 years' experience leading and delivering regional and national skills and competence development programmes Neil is no stranger to hazardous operations. His early career as an aircraft engineering artificer and flying maintainer in the Royal Navy on ASW and Commando Helicopter Squadrons he spent two winters inside the Arctic Circle, with deployments in the European theatre of operations, Mediterranean, Far East and Gulf, primarily supporting mountain flying and desert operations.

After an introduction by Neil, Graeme will share his personal insights on the journey to improve leadership of process safety and the challenges of improving awareness throughout the workforce.

15. Competence in Hazardous Areas – How the IECEx System can Help

Thursday 9.30 – 10.10 - Main conference room

Thorsten Arnhold - Chairman, IECEx

Prof. Dr. Thorsten Arnhold *is Chairman of the IECEx System and VP Strategy & Technology at R. STAHL AG. Earlier, he was Chairman of the German National Committee of IECEx and VP Product Management and Marketing at R.STAHL, and before that a Quality Manager for ISO 9000 system implementation.*

He studied electronics at Dresden Technical University and gained a PhD in Hybrid Integrated Circuits, and has a Diploma in Marketing from St. Gallen Business School.

Investigations show that the overwhelming majority of accidents in hazardous areas are caused by a lack of competence, of clear responsibilities and of commitment. In the presentation, this statement will be illustrated by current accidents in European process plants and I will show how a third-party certification system such as that provided by IECEx can help.

Due to commercial pressures, many companies have reduced the number of in-house safety experts and transferred these obligations to external service providers. This reduces costs and gives some flexibility, but without sufficient internal experts it is very difficult to control the competence and experience of external service providers and of new employees. A Third Party Certification system such as IECEx helps to bridge that gap.

Based on the international standards of the IEC 60079 series, service providers for plant design, equipment selection, installation, inspection, maintenance, repair and overhaul are assessed and certified by independent external experts.

Furthermore the Certification Scheme for personal competency offers an independent evaluation of the knowledge and skills of people who work in hazardous areas both employees of the process companies as well as external service providers. These certificates are available 24/7 on the IECEx homepage, giving responsible persons at end user companies the ability to select the right partners for their safety critical jobs.

16. Reflecting 25 Years of Validating Core Competencies

Thursday 10.15 – 10.55 - Main conference room

Martin Jones - Operations Manager, CompEx

Martin Jones *manages the global operations and strategic development of the CompEx Core Competency Scheme for Electrical and Mechanical practitioners and professional Application Design Engineers who work in Explosive Atmospheres.*

His 20 years experience as a qualified electrical craftsman and electrical engineer in British Coal Corporation in the UK, where he was legally / statutorily responsible for the safe installation, testing and maintenance of all electrical equipment at the coal mine, both surface and underground, together with 7 years managing the production of chipboard and MDF board at Europe's largest board panel manufacturer has provided vast experience towards working safely in Gas & Dust Atmospheres.

This Conference Paper will stress the importance of validating core competencies with independently accredited organisations to help protect both the workforce and the expensive capital asset whilst also protecting the Owners and Responsible Persons.

Throughout the development and growth of the CompEx Scheme during the last 25 years, with Industry and Regulator guidance, modules have significantly grown from the original Gas & Vapour modules to a full suite of 14 core competency modules and various Foundation Awareness Modules, all of which address the requirements of the international IEC Standard 60079 Parts 14 (Installation) & 17 (Inspection). Additionally, the North American National Electrical Code NEC 500 & 505 Modules and American Petroleum Institute API 500 / 505 Modules were developed specifically for users having assets in the Gulf of Mexico.

Managing this growth and ensuring certification turnaround is maintained is not without its challenges. Moving paper-based examinations to online examinations and moving practical assessment recording onto iPad technology presented unique challenges.

The defining moment in the scheme's history was the three years between 2007 and 2010 where the CompEx Operations Manager and CompEx Quality Manager set about wrestling to the ground the gap analysis that would enable the CompEx Certification Body, JT Limited, to be awarded the prestigious recognition that the CompEx Scheme rules, governance, policies and procedures met the requirements of the International Standard ISO/IEC 17024 : 2012 Conformity Assessment – General Requirements for bodies offering Certification of Persons. This accreditation, awarded by the United Kingdom Accreditation Service, UKAS, which in turn are accredited by the International Accreditation Forum (IAF). Proving the CompEx Scheme met all the requirements of impartiality, no conflict of interests and involvement of key stakeholders in the governance of the Scheme was indeed a defining moment.

That said, the way forward offers new frontiers, the first being Functional Safety Foundation and followed quickly by a core competency module for Functional Safety Technicians against the International Standard for Process Safety IEC 61511, which take CompEx into new frontiers, mapping the proven core competency validation model across into new international standards.

17. Managing Cybersecurity and Functional Safety

Thursday 11.30 – 12.10 - Main conference room

Sarabjit Purewal - HSE Principal Specialist Inspector

***Sarabjit Purewal** leads an electrical, control and cybersecurity team in the onshore major hazards section of the Health and Safety Executive (HSE). He is a chartered engineer, an associate of City and Guilds Institute, and member of the Institution of Engineering and Technology. Sarabjit started his career with the CEGB in the electricity supply industry working on automation of conventional and nuclear power stations.*

He later worked with Kennedy and Donkin Consulting Engineers as the engineering manager of the Power Group, and then with Mott MacDonald as divisional director, before moving to the Health and Safety Executive working on various technical and policy issues.

Cybersecurity is a relatively new topic that industry is becoming familiar with. New standards such as IEC 62443 are at an advanced stage of completion. New guidance is being published by the National Cybersecurity Centre (NCSC) and new regulations such as security of Network Information Systems (NIS) have come on statute in 2018.

Cybersecurity impacts on many systems that are designed for functional safety where the design methods do not assume that someone is deliberately trying to introduce malware into the systems. So what are the issues around managing safety systems from a cybersecurity perspective?

Other than the issues in managing safety systems securely, the presentation will also explore technical issues around risk assessments, risk appetite, and managing cybersecurity including supply chain to organisational issues of leadership, and competency.

18. Security Risk Assessments for Functional Safety

Thursday 12.15 – 12.55 - Main conference room

Colin Easton - Principal Safety Consultant, Prosalus

Colin Easton *is a Principal Safety Consultant at ProSalus Limited and has over 30 years of safety related experience as well as an international reputation for the provision of consultancy and training services, predominantly in the process industry sector, assisting clients to meet their safety, legislative, and regulatory obligations.*

His main areas of specialisation are delivering safety training, the Functional Safety Assessment, Verification and validation of new and legacy plant safety systems, facilitation of safety studies, quantitative risk analysis and developing functional safety management systems including gap analysis

He has an MSc Eng. in Process Safety & Loss Prevention from the University of Sheffield, is an accredited TÜV Rheinland Functional Safety Senior Expert and a member of the Institute of Measurement and Control Safety Panel.

Safety Instrumented Systems (SIS) are more vulnerable today than ever before due to the prevalence and sophistication of attacks specifically targeting them. Although these attacks may be initially intended to hold a business to ransom by denial of service, the resultant consequences can be catastrophic, leading to a failure or unpredictable operation of the SIS resulting in a safety or environmental incident. These vulnerabilities are not just as a result of the availability of commercial off-the-shelf technology; high connectivity to business and manufacturing enterprise systems; requirements for remote access and availability of OEM system data in the public domain, but can also be related to the training and awareness of a business' core staff.

BS EN 61511:2017 2nd Edition and the UK HSE Operational Guidance OG-00086 introduce requirements for all owners of process safety systems to carry out a security risk assessment (SRA) to identify these threats. However, the security standards and practices for industrial automation and control systems continue to evolve while the process industry is struggling to keep abreast of the changing threat and regulatory landscape. In addition, the plethora of standards, guidance and articles being published to help address the SRA requirement has resulted in information overload.

This presentation will break down the requirements of BS EN 61511:2017 2nd Edition in the context of IEC, ISA, API and NIST requirements. It will also provide a practical methodology for meeting the requirements of BS EN 61511:2017 2nd Edition to be able to satisfactorily demonstrate to the regulatory authorities that the risks from security breaches have been reduced to a level that can be considered ALARP.

19. E.I. Not Permanently Attended Installation Guidelines

Thursday 14.00 – 14.40 - Main conference room

James Jenkins - Principal Consultant, DNV GL

***James Jenkins** is a versatile Safety Engineering Consultant with thirteen years' experience in a wide range of process industries. James is a Principal Consultant within DNV GL Manchester Advisory, and has been significantly involved in projects for the offshore oil and gas industry, as well as the LNG, gas transmission and food & beverage sectors.*

He has worked extensively on consultancy projects which establish risk management frameworks, assess risks in operation, support regulatory compliance activities and assessment of major accident management activities. He has participated in due diligence projects both on behalf of sellers and prospective buyers.

James is a primary author of the OGUK guidelines for NUI helideck Fire Fighting Equipment and the Energy Institute's NPAI guidelines (2nd Edition).

In June 2010 the Energy Institute issued the first edition of the Not Permanently Attended Installation (NPAI) guidelines. The document sought to provide best practice guidance on issues of safety, welfare and the environment consistent with optimising the benefits of NPAI's for the international petroleum industry. The EI and DNV GL have recently revised the NPAI Guidelines to more accurately reflect current international best practice.

The focus of the guidance is on two principals:
a) To maintain and where possible, improve, safety through identification and adoption of industry best practice; and
b) Address where costs savings, production optimisation and enhancement can be realised which are consistent with safe and environmentally responsible operation.

Increasingly operators, through improved connectivity and plant control have explored possibility to remotely operate geographically disparate plants from a central control room. The themes and topics within the NPAI guidelines would be applicable to these onshore operations as points for consideration should an operator design, inherit or retro-fit such a remote manning philosophy.

The NPAI guidelines cover the lifecycle of an installation and focus on describing the process that the reader should adopt to reach the most suitable design or operation for their NPAI. Throughout the guidance there is a clear theme that processes should be examined on a risk basis over the lifecycle of the NPAI taking account the balance between major accident risks (safety and environmental), travel risks, welfare issues and operational factors.
The topics that a presentation will cover are:
• Design of remotely operated installations;
• Transition from normally manned to remotely operated installations (and vice-versa); and
• Operation of remotely operated installations.

Each topic will look at several key themes that are important to consider with remote operations including: staffing demand versus the productive hours; benefit of safety systems versus the risk exposure associated with maintaining them; simplification/minimisation whilst providing adequate welfare provision; safety management; environmental aspects; reliability/availability; maintenance strategies; asset integrity; changing production profiles; and legislative compliance.

With over 100 NPAI's and numerous NPAI operators within the UK Continental Shelf, the NPAI guidelines are a distillation of the learning from these operations which attendees should find informative, insightful and useful.

20. Hazardous Area Classification Chemical Plant Case Study

Thursday 14.45 – 15.25 - Main conference room

Carolyn Nicholls - Director & Process Safety Expert, RAS

***Carolyn Nicholls** is a process safety specialist and a Director of RAS Limited, with more than 10 years' experience of the risk and hazard management industry. She has worked with a number of UK COMAH sites to develop safety reports and provide support in all aspects of risk management.*

She leads the RAS teams of risk and hazard management consultants and has been instrumental in creating the company's assessment methodologies. Her particular area of interest is the demonstration of ALARP, an often misunderstood concept.

It is important that care is taken when determining hazardous zones. The consequences of applying the wrong technique are clear: hazards can be underestimated and inadequately controlled, or can be overestimated resulting in resource expenditure and prioritisation in the wrong places. In this paper, Carolyn Nicholls RAS Ltd. explains the methods that have been used to overcome this challenge using a case study from a chemical manufacturing site currently revising their hazardous area classification, which considers both gaseous and liquid releases.

Workplaces that handle dangerous substances with the potential to form an explosive atmosphere fall under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR). These regulations require workplaces to be classified into hazardous and non-hazardous areas, with the aim of ensuring potential ignition sources are properly controlled so as to reduce the risk of workers to as low as reasonably practicable.

The regulations do not provide a methodology for how to classify these zones. As a result, a number of organisations have developed their own methodologies to do this, the most notable of these being the British Standards Institute and the Energy Institute.

For accidental releases, both the British Standard and Energy Institute methodology follow the same core steps:

1. Select an appropriate hole size.
2. Estimate the size of the LFL cloud from that hole size.

Look-up tables in both methodologies may be used to accomplish step 1. For step 2, however, there are a number of challenges that may not be clarified depending on the site and its processes:

- Neither methodology provides guidance on how to adequately estimate the size of pools from releases.
- The British Standard methodology is straight forward for gaseous releases, but falls short for liquid releases, particularly in how to determine the flash fraction at the release point.
- The Energy Institute methodology is primarily written for the petroleum industry. The look-up tables allow hazard radii to be selected; however, these are based on the dispersion modelling of petroleum products. Additionally, the dispersion modelling is carried out at an operating temperature of 20 °C, which may not be applicable to all releases.

For some chemical sites, these limitations can mean dispersion modelling is the only way to accurately determine the size of hazardous zones from releases. Where sites handle unusual materials, especially at high temperatures, there is a challenge in what approach to take. This can be especially problematic in cases where these chemicals are unavailable in modelling software.

It is important that care is taken when determining hazardous zones. The consequences of applying the wrong technique are clear: hazards can be underestimated and inadequately controlled, or can be overestimated resulting in resource expenditure and prioritisation in the wrong places.

In this paper, Carolyn explains the methods that have been used to overcome this challenge using a case study from a chemical manufacturing site currently revising their hazardous area classification, which considers both gaseous and liquid releases. In summary, the key findings and method include:

- Use of both point source and risk-based approaches provided in the Energy Institute methodology in combination to determine the hole size for releases.
- Use of dispersion modelling inputs provided in the Energy Institute methodology.
- Use of surrogate materials that are selected based on similar key material properties justified by comparison of consequence modelling results.
- Identifying the key assumptions for modelling liquid pool diameters.

21. Gaining Value from Investigations

Thursday 9.30 – 10.10 - Seminar room

Joe Murphy - Head of Health, Safety, Security and Wellbeing, Southern Water

Joe Murphy *is Head of Health, Safety, Security and Wellbeing at Southern Water. Prior to that he was Head of Health, Safety and Security - Area South - at High Speed Two (HS2) Ltd for over five years, Managing Director of a risk compliance consultancy, HSEQ Manager at Morrison Utility Services and has extensive work experience in both the rail and water industry sectors.*

He also developed a training facility for Thames Water and network partners.

Accidents in the workplace are never welcome, but rather than being something to brush under the carpet, these incidents offer businesses the chance to improve and right wrongs for the future. Key to this is ensuring that investigations can be carried out thoroughly and accurately, the groundwork for which can be laid within the culture of an organisation.

This involves asking tough questions, digging deep into the events leading up to the incident, creating a blame-free environment and ensuring there is the right culture within the organisation to ensure a free flow of information.

Murphy will discuss how this sort of environment can be created and other steps businesses can take, like providing training for proper incident investigation techniques such as interviewing, protecting evidence and taking witness statements.

22. Barrier-based learning from incidents

Thursday 10.15 – 10.55 - Seminar room

Paul McCulloch - Risk Management Process Safety & Implementation, CGE

***Paul McCulloch** is a Risk Management Process Safety & Implementation Consultant at CGE Risk Management Solutions working on the implementation of BowTie risk management programs.*

Previously he worked within E.ON Next Generation business as a Process Safety Specialist and was the chief architect of E.ON's award winning Process Safety project using BowTies and BowTie Server from CGE.

Before joining E.ON, Paul spent four years as a process safety specialist with ABB Engineering Services delivering solutions to their clients in Petrochemical/Oil & Gas/Power and Speciality Chemical industries. Key focus was technical process safety - consequence modelling, ALARP assessment, SIL assessment and Hazard Study leadership.

Prior to that he worked for fourteen years on a number of petrochemical and speciality chemical production facilities, mainly with ICI or divested ICI businesses in the north east of England.

Mapping barrier performance from an incident on a BowTie assessment allows an organisation to lock learning into corporate memory, and over time as more and more incidents get mapped to the BowTie, an organisation builds up a profile of positive and negative performance of their barriers from their incidents. By establishing a connection of barrier performance to risk management BowTies, an organisation has a picture of real barrier performance against its proactive risk assessments and can take corrective action.

23. Failure to Understand and Manage Risks

Thursday 11.30 – 12.10 - Seminar room

Roger Stokes - Principal Engineer, BakerRisk

Roger Stokes *joined BakerRisk in 2015 and is Principal Engineer in the Process Safety Group, where his main focus is on incident investigation and insurance risk engineering. After graduating as a chemical engineer he took a position in ICI's Mond Division, ending up as a plant manager. Later, he joined a firm of Loss Adjusters dealing with commercial insurance claims including fires, explosions and machinery breakdown on chemical, food processing and other manufacturing facilities.*

This paper presents a case study of an incident that occurred outside the traditional area of process safety, although the circumstances and the learnings are highly relevant to the high hazard process industries. Key areas of failure include leadership, accountability, risk assessment, following established procedures, management of change, consideration of off-site impacts, and emergency procedures. Organisational issues associated with culture and whistleblowing also played a key role in the incident.

24. Risk Management & Engineering Judgement: Four Shades of Grey

Thursday 12.15 – 12.55 - Seminar room

Harvey T. Dearden - Engineering Director, HTS Engineering Group

Harvey T. Dearden *BSc CEng is FS Expert TUV Rheinland 188/12, InstMC Registered Functional Safety Engineer 16/003, a Professional Process Safety Engineer (IChemE), and the author of 'Functional Safety In Practice' and 'Professional Engineering Practice'.*

The effective exercising of engineering judgement may be identified as one of the hallmarks of the true professional engineer. But in embracing this notion, there is perhaps a danger that individual engineers may become over-eager to exercise their judgement in demonstration of their professionalism. We may identify a further hallmark as an awareness of this danger and the recognition of the need to guard against it. The all too human traps of arrogance and hubris are set to ensnare us. We need to exercise appropriate meta-judgement; judgement about judgements.

Our primary defence must be an awareness of this situation, and in this regard, it may be useful to consider the 'space' within which engineering judgement is exercised by the individual engineer.

This presentation identifies the dimensions that characterise this space and the degree to which engineers should validate their judgements and how they might do this. The 'Four Shades' refers to the distinct areas by which the space is characterised.

25. Eliminating Explosion Risks Through Properly Sealed Cables

Thursday 14.00 – 14.40 - Seminar room

Jonathan Hichens - Lead Certification Engineer, CMP Products

Jonathan Hichens *is Lead Certification Engineer for CMP Products Ltd, a market leader of cable glands, cable cleats and accessories. He has been with CMP for over two years where he oversees the team responsible for testing and certification of a portfolio of products for industrial and hazardous applications.*

Prior to working at CMP Products he spent several years as a project engineer and project manager for a bespoke fluid handling systems OEM, primarily for hazardous locations applications, and before that was an Aircraft Mechanic in the Royal Air Force.

This report was commissioned in order to establish the correct type of cable gland for a particular type of cable construction when used in Zone 1 and Zone 2 hazardous areas. This resulted into an investigation and testing program to establish if selecting cable glands using the guidance from IEC 60079-14 Electrical installations design, selection and erection - is in fact safe for flameproof applications using cables typically used in marine and offshore.

The applicable standard which dictates if a barrier type or non-barrier type cable gland should be used, IEC 60079-14, proposes criteria to make this selection, which is a point of contention in the industry, and it is believed by many that it is possible to meet the requirements of the standard with a cable / cable gland combination that is unsafe for use in the intended Flameproof type ‘d’ (Ex ‘d’) application.

Several varied cable/cable gland assemblies were put through the following tests to collect data on how non-barrier cable glands, employing an elastomeric sealing ring, performed in the prevention of flame transmission and gas migration under test conditions:

- Test 1: Flame non-transmission of an internal ignition. IEC 60079-1:2014 Cl 15.4.4
- Test 2: Restricted breathing test. IEC 60079-14:2013 Annex E (Informative)
- Test 3: Gas migration test (Bespoke)

These test results were then assessed against the requirements of the installation standard (IEC 60079-14), and the standard itself is examined for its potentially dangerous guidance on the selection of cable glands. For example in the clause 9.3.2 of this edition 5.0, when it states “where there is a likelihood that gas or vapour migration may occur through the interstices between individual cores of a cable, and the cable leads to a non-hazardous area or between zones, then the construction and application of the cable shall be taken into account.” This can be seen as an attempt to pass the responsibility onto end users to use “good engineering practice” and assess each case independently. It is thought however, that this has the opposite effect and is in fact conducive of “bad engineering practice”.

The results of the investigation show that the selection criteria detailed in the IEC-60079-14:2013 (edition 5.0) installation standard, allows for situations where non-barrier type cable glands can be used with unsuitable cables for various applications, and how the standard could be improved to promote safer selection of cable glands for flammable atmospheres.

26. Using Equipment Protection Levels to Break the Chain

Thursday 14.45 – 15.25 - Seminar room

Keith Plumb - Process, Equipment and Safety Consultant BPE

Keith Plumb *is Process and Equipment Consultant at BPE Design and Support Ltd. He is on the Pharma Special Interest Group and Board of Trustees at IChemE and Visiting Lecturer at the University of Chester covering Food and Pharmaceutical Engineering.*

He has more than 40 years' experience in the pharmaceutical, biopharmaceutical, fine chemical and allied process industries. His experience covers multinational manufacturing companies, engineering design companies and consultancies.

Keith's specialties are: Dust explosion risk reduction; Dust hazardous area classification; ATEX and non-electrical equipment; Safety of machinery in the process industries and Process mechanical design for pressure equipment.

It is clear that a hazardous area classification plus equipment selection does not constitute a complete risk assessment because an assessment of the consequences is not included. EN IEC 60079-10-1 reflects this and states, "Subsequent to the completion of the area classification, a risk assessment may be carried out….". It then goes on to suggest that as a result of the risk assessment the required EPL may be higher or lower than normal.

In the UK the requirements are mandatory because the Dangerous Substances and Explosive Atmospheres Regulations require a risk assessment to be carried out and that risk assessment needs to include "the scale of the anticipated effects of a fire or an explosion".

Carrying out such a risk assessment allows the chain: grade of release leading directly to a hazardous zone directly leading to an EPL to be broken. Which means that a number of scenarios can be considered e.g. unusually high consequences or unusually low consequences (resulting from a small scale, for example), which in turn can result in changes to the EPLs selected for equipment to be used in the designated hazardous zones.

Another area where breaking the chain can be advantageous is in respect of blanket zoning which is frequently used to allow future proofing and potentially a simpler operating and maintenance regime.

This paper presents practical examples of breaking the chain when the consequences of an explosion would be high or low and when blanket zoning is advantageous.

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The company's core expertise is the production of high quality analogue and digital signal conditioning modules for both ATEX and safe area applications. The product range covers a wide variety of functions within signal conditioning such as displays, Ex barriers, and field mounted Ex transmitters.

PR electronics is a consolidated international company with its headquarters in Jutland, Denmark since 1974. The UK head office is based in Chichester, West Sussex.

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Trolex - Event & Awards Sponsor - Newby Road, Hazel Grove, Stockport, Cheshire, SK7 5DY, UK

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Trolex Ltd is a leading provider of workplace safety technology solutions to the mining, industrial and tunnelling sectors.

Trolex has over 50 years' experience catering for international businesses, providing state-of-the-art equipment and pioneering safety technology to highly diverse workforces operating in hazardous environments. Trolex creates safety technology solutions and products that are functional under any condition, in any environment and for any worker.

Through the development and introduction of disruptive technology, Trolex ensures workers operating within challenging and hazardous environments can maintain a healthy work and wellbeing balance.

Trolex deploys its products across 35 countries for some of the world's leading corporations, meeting international standards of compliance and certifications. Trolex products protect both employees and business assets, maximizing efficiency and improving the experience of workers in the field.

Combining over five decades of experience within the mining, industrial and tunnelling sectors, Trolex creates products that are highly functional, easy to use and aesthetically pleasing. Trolex is motivated by the aim of saving lives, saving money and improving the wellbeing of its customers.

The Trolex range of products has been developed to give its customers the very best safety and monitoring technology for improved working life. These include:

- Trolex Air X Series - Real-time, continuous and highly accurate Particulate Monitoring Systems.
- Trolex Falcon Series - Robust, rapid-assembly, Power, Data and Fibre Ex Connectors for use in hazardous areas.
- Trolex Rock Monitor Series - Strata Monitoring and Ground Control Instrumentation for safe and efficient mines.
- Trolex Sentro Series - The world's foremost range of fixed, portable and truly wireless Gas Detection Systems for hazardous areas.
- Trolex GasHawk - Personal 1-to-6 gas detector with automatic wireless charging and extended battery life. This detector - which comes with a replacement sensor package - reduces the cost of ownership by about 80% compared to competitors.

Trolex Group is a privately owned, Manchester-based business, headed up by Group CEO Glyn Jones. Jones has successfully grown a number of businesses, and has spent the last eight years at Trolex acquiring a wealth of experience in the industrial, mining and tunnelling sectors. As CEO, his role not only sees him responsible for the management of a 100+ workforce, but also requires him to ensure the successful delivery of partnerships, acquisitions and progressive products.

Jones is leading Trolex as it embraces the latest technological advancements, challenging employees to embrace creativity and innovation, and to develop products and manufacturing solutions that position Trolex as the leading name in safety technology.

EXHIBITION CONTACTS

Airfal International (Stand 15)
C/Rio Esera 4,
Villanueva de Gallego,
Zaragoza 50830 , Spain
Tel: +34 (0)976 618 5809
Email: marketing@airfal.com
Web: www.airfal.com

Anamet Europe B.V. (Stand 9)
Galwin 5, 1046 AW,
Amsterdam, The Netherlands
Tel: +31 (0)20 5863586
Email: s.simsek@anamet.nl
Web: www.anameteurope.nl

Beamex Ltd (Stand 12)
Unit 1, Interchange 21,
Centre Court Meridian Business Park,
Leicester, LE19 1WD, UK
Tel: +44 (0)1455 821920
Email: john.healy@beamex.com
Web: www.beamex.com

Blackline Safety Europe Ltd (Stand 16)
Unit 11, Wakes Hall Business Centre
Wakes Colne, Colchester,
CO6 2DY, Essex, UK
Tel: +44 (0)1787 222684
Email: Eusales@blacklinesafety.com
Web: www.blacklinesafety.com

C&P Engineering Services Ltd (Stand 19)
Gorseinon Road, Gorseinon,
Swansea, SA4 9GE, UK
Tel: +44 (0)1792 897002
Email: info@cpengineering.co.uk
Web: www.cpengineering.co.uk

CCG Cable Terminations Ltd (Stand 11)
31 Metcalfe Rd, Skippers Lane
Industrial Estate, Middlesbrough,
TS6 6PT, UK
Tel: +44 (0)1642 430346
Email: t.murray@ccgcablegland.co.uk
Web: www.ccgcablegland.co.za

Centrica Business Solutions (Stand 31)
Centrica plc, 1st floor,
Reresby House,
Bradmarsh, Rotherham,
S. Yorks, S60 1BY, UK
Tel: +44 (0)1709 846967
Email: levi.bridgeman@centrica.com
Web: www.centricabusinesssolutions-electrical.com

COGENT Skills (Table Top)
5 Mandarin Court, Warrington,
Cheshire, WA1 1GG, UK
Tel: +44 (0)1925 515200
Email: samantha.collins@cogentskills.com
Web: www.cogentskills.com

CorDEX Instruments (Stand 22)
Unit 1, Owens Road,
Skippers Lane Industrial Estate,
Middlesbrough, TS6 6HE, UK
Tel: +44 (0)1642 454373
Email: sales@cord-ex.com
Web: www.cord-ex.com

JT Limited / CompEx (Stand 4)
Redwither Tower,
Redwither Business Park,
Wrexham, LL13 9XT, UK
Tel: +44 (0)1978 663701
Email: MartinJones@Jtltraining.com
Web: www.compex.org.uk

CSA Group (Stand 30)
Unit 6, Hawarden Industrial Estate,
Hawarden, Deeside, CH5 3US, UK
Tel: +44 (0)1244 670900
Email: ukinfo@csagroup.org
Web: www.csagroupuk.org

DEKRA Process Safety (Stand 3)
Phi House, Southampton Science Park, Southampton, Hampshire,
SO16 7NS, UK
Tel: +44 (0)2380 760722
Email: adam.bell@dekra.com
Web: www.dekra-process-safety.co.uk

Draeger UK Ltd (Stand 32)
Ullswater Close, Blyth,
Riverside Business Park, Blyth,
Northumberland, NE24 4RG, UK
Tel: +44 (0)1670 352891
Email: marketing.uk@draeger.com
Web: www.dekra-process-safety.co.uk

Entrematic - Dynaco (Stand 1)
Atex High Performance Doors
Waverstraat 21, Moorsel,
9310 Belgium
Tel: +32 (0)53 72 9898
Email: yves.degroote@entrematic.com
Web: www.entrematic.com

Exloc Instruments UK (Stand 27)
Unit 7, Riverside Court,
Delph, Oldham, OL3 5FZ, UK
Tel: +44 (0)1457 239301
Email: sales@exloc.co.uk
Web: www.exloc.co.uk

Extronics & Hanley Technology (Stand 14)
1 Dalton Way, Midpoint 18,
Middlewich, Cheshire,CW10 0HU, UK
Tel: +44 (0)845 2775000
Email:info@extronics.com
Web: www.extronics.com
Web: www.hanleytechnology.com

Getac (UK) Ltd (Table Top)
Mitac House, Nedge Hill,
Telford, Shropshire,
TF3 3AH, UK
Tel: +44 (0)1952 207200
Email: sophie.kent@getac.com
Web: https://en.getac.com

GfG Gas Detection UK Ltd (Stand 5)
8 Griggs Business Centre,
West Street, Coggeshall,
Essex, CO6 1NT, UK
Tel: +44 (0)1376 561463
Email: john@gfggas.co.uk
Web: www.gfggas.co.uk

HTS Engineering Group Ltd (Stand 26)
7 Beeston Court, Stuart Road,
Manor Park, Runcorn,
Cheshire, WA7 1SS, UK
Tel: +44 (0)1928 238360
Email: info@htsgrp.com
Web: www.htsgrp.com

Moore Industries Europe Inc. (Stand 6)
1 Lloyds Court, Manor Royal,
Crawley, West Sussex,
RH10 9QU, UK
Tel: +44 (0)1293 514488
Email: sales@mooreind.com
Web: www.miinet.com

Mutech Ltd (Stand 10)
Unit 9, Wharfside Business Park,
Irlam Wharf Road, Manchester
M44 5PN, UK
Tel: +44 (0)161 872 0400
Email: sales@mutech.co.uk
Web: www.mutech.co.uk

Oncam (Stand 25)
Building 4, Chiswick Park,
566 Chiswick High Road,
London, W4 5YE, UK
Tel: +44 (0)7825 885972
Email: sreed@oncamgrandeye.com
Web: www.oncamgrandeye.com

Rose - Phoenix Mecano (Stand 21)
26 Faraday Road, Aylesbury,
Bucks, HP19 8RY, UK
Tel: +44 (0)1296 611660
Email: MMITHA@pmgb.co.uk
Web: www.rose-enclosures.co.uk

PR electronics (UK) Ltd (Stand 20)
Middle Barn, Oak Lane, Apuldram,
Chichester, PO20 7FD, UK
Tel: +44 (0)1243 776450
Email: twe@prelectronics.co.uk
Web: www.prelectronics.com

RAS Ltd (Stand 28)
73 New Crane Street,
Chester, CH1 4JE, UK
Tel: +44 (0)1244 674612
Email: enquiries@ras.ltd.uk
Web: www.ras.ltd.uk

Rheintacho UK (Stand 23)
17 Enterprise Court, Pit Lane,
Micklefield, Leeds, LS25 4BU, UK
Tel: +44 (0)113 287 4411
Email: sales@rheintacho.co.uk
Web: www.rheintacho.com

Roxby Training Solutions Ltd & F.E.S. (EX) (Stand 29)
Unit W1, Wellington Court,
Preston Farm Business Park,
Stockton on Tees, TS18 3TA, UK
Tel: +44 (0)1642 438700
Email: training@roxby.com
Web: www.roxby.com
Web: www.fes-ex.com

RUGGED MOBILE Systems Ltd (Table Top)
Park View Business Centre,
Combermere, Whitchurch,
Shropshire, SY13 4AL, UK
Tel: +44 (0)8456 520816
Email: sales@rm-systems.co.uk
Web: www.ruggedmobilesystems.co.uk

SGS Baseefa (Stand 8)
Rockhead Business Park,
Staden Lane, Buxton, Derbyshire,
SK17 9RZ, UK
Tel: +44 (0)1298 766608
Email: carolyn.featherstone@sgs.com
Web: www.sgs.co.uk/sgsbaseefa

Tempa Pano UK Ltd (Table Top)
Unit 5, Tempa Pano House,
Centre 21 Industrial Estate,
Bridge Lane, Woolston,
Warrington, WA1 4AW, UK
Tel: +44 1925 811290
Email: sales@tempapano.co.uk
Web: www.tempapano.com

Trolex Ltd (Stand 7)
Newby Road, Hazel Grove,
Stockport,
Cheshire, SK7 5DY, UK
Tel: 0161 483 1435
Email: matthew.evans@trolex.com
Web: www.trolex.com

Vega Controls (Stand 24)
Kendal House, Victoria Way,
Burgess Hill, West Sussex,
RH15 9NF, UK
Tel: +44 (0)1444 870055
Email: info.uk@vega.com
Web:www.vega.com/uk

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CONFERENCE ASSESSMENT FORM HAZARDEX 2019

NAME: COMPANY:

1. Are you a:							
Delegate		Chairman / Speaker		EventSponsor / Partner		Invited Guest	

2. How did you hear about this year's Conference?											
Hazardex Magazine		Hazardex Website		By Email		Direct Mail Shot		Word-of-Mouth		Partner / Exhibitor	

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3. How did you rate the event overall?									
Excellent		Very Good		Good		Average		Poor	

4. In your opinion, what were the top three presentations in terms of usefulness?

5. What did you consider to be the high point(s) or low point(s) of the event in general?

Hazardex 2019

- Are there any topics that you feel would need to be updated or expanded upon next year? _____
- Are there any new topics you'd like to see covered next year? _____
- In your opinion, how else can we improve the Event? _____
- In your opinion, should the event move geographical location regularly – and if so where would you like it to be i.e. Other European, Middle East or World Location _____
- Would you object to any of your comments being published in Hazardex The Journal? YES / NO
- Would you prefer to receive the conference notes in electronic format rather than hard copy? YES / NO

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Please now return it to the Organisers - email hazardex@imlgroup.co.uk

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