

A unique industry, with unique companies and unique news

Elements

H2

In this issue:

- *Decarbonisation and how can my company decarbonise?*
- *Hydrogen as a fuel source and the hydrogen economy*
- *Carbon reporting and trading*
- *Green while you clean but protect your ideas*
- *International trade and Brexit articles*
- *Innovative leadership*
- *plus many more features and articles*

2021

Save the date! Chemicals Northwest Awards

25 March 2021
@the Hilton
Manchester Deansgate

We are delighted to announce that the next Chemicals Northwest Awards dinner will be taking place on the 25th March 2021 at the Hilton Manchester Deansgate.

Further details to follow



Chemicals 
northwest 

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Membership

Would your company benefit from joining an organisation that supports and promotes the chemistry-using sector in the Northwest? Do you want to understand more, and contribute to, the industry issues within the region?

If you are a manufacturer, chemical user or offer products and services to the sector, why not join us today? See over for details or please contact:

Alex Abraitis - Member services and events manager
alex.abraitis@chemicalsnorthwest.org.uk or visit:

<https://www.cia.org.uk/chemicalsnorthwest/Membership/Benefits-Costs/>
2021 rates. (from 1st April 2020)

Micro corporate membership (1 - 10 employees)	£445+VAT
Standard corporate membership (11-100 employees)	£774+VAT
Large corporate membership (100+ employees)	£985+VAT

Our membership year runs from 1 April to 31 March. A pro-rata basis usually applies to joining at other times in the year and we'd be happy to discuss on application.

Welcome

Dear reader,

Ian and I hope that you are all keeping well.

In this edition of Elements, we have focused on the Hydrogen Economy and Decarbonisation. The North West is leading the UK in developing an innovative, sustainable and low-cost energy system. With so many key players, some CNW member companies, key influential stakeholders and academics, the North West is set to become the UK's first low carbon industrial cluster. We will look to build upon the geographical expertise in the months ahead as we share opportunities across the membership.

Also featured is an update on trade negotiations and Brexit, not to mention some excellent features contributed by member companies.

We have continued to host our monthly member briefing meetings which have been valuable in sharing information throughout the pandemic. The focus has shifted from PPE and H&S to sharing best practise amongst members on return to work, track and trace and quarantining. The August briefing included a presentation by Grant Thornton who provided a perspective on the ongoing Brexit negotiation and what we might expect over the next couple of months. We hosted an online breakfast networking event in June which was both well attended and received. We had hoped to deliver the October breakfast "live" at Sci-Tech Daresbury but due to car parking restrictions we will now host this via webinar. Anyone is welcome to attend the breakfast meetings free of charge and we look forward to welcoming you to the event.

We look forward to showcasing the CNW 2020 Award winners in the next edition of Elements. We took the decision to postpone the 2020 awards due to COVID. This was not an easy decision, but I would like to thank you all for your support. With encouragement from our fantastic sponsors the 2021 dinner has been confirmed for the 25th March 2021 at the Hilton Manchester Deansgate – a date for your diaries. We will be launching the awards in September and look forward to hearing some positive case studies on the work that has been carried out during an incredibly challenging 2020.



Please keep an eye on our website pages for events, latest news, industry updates and current Elements magazine -

<https://www.cia.org.uk/chemicalsnorthwest/>

Alex Abraitis
Member Services & Events Manager

About us...

Chemicals Northwest is an established business network wholly owned by the Chemical Industries Association.

With around 140 members we actively promote this important regional sector and our objective is to help membership to grow through;

- **facilitating** networking events, common interest groups and interactive workshops, all aimed at covering topical industry issues.
- **supporting** projects and programmes that identify and enhance business performance and generally support continuous improvement across the sector.
- **promoting** science and engineering based skills, helping to address the region's future needs.
- **improving** the image of the industry overall, including generating a positive reputation, through communicating achievements and success.
- **contributing** to the industry's strategic voice and the national growth agenda aligned to the work of the Chemical Industries Association.
- **connecting** the community of chemistry-using businesses and the vital supply chains here in the Northwest.

Chemicals Northwest really does bring people together! It is an essential feature of successful networking strategies used by many organisations. We coordinate a range of meetings and events to enable 'face to face' networking for the benefit of all members. Every successful business networking organisation also needs effective communications channels.

As a result of gradual development over recent years, getting messages across, promoting member companies and reporting news, Chemicals Northwest has reached new levels of topicality and quality. Here are the the main features and benefits of membership...



Annual Awards Dinner - During the annual CNW awards programme we are privileged to witness the many achievements made in our local sector. Culminating in a great night of celebration each year's awards are a fantastic way your company can support the region's chemicals sector and help raise your own profile. Up to 300 guests from across the industry gather on the night and everyone can see for themselves the amazing achievements made by our people and organisations.

"Focus 50" - This recently named series of seminars and networking events is becoming ever more popular.

Over the years CNW has focused on a range of highly topical and relevant business issues. Technical, regulatory and operational insights have been delivered by experts in their fields. These events ensure good practices are shared and all gain new knowledge. As businesses get to grips with the changing landscape there will always be new issues for members to analyse.



Breakfast Networking - Chemicals Northwest is gaining a growing reputation for high quality breakfast networking events. With no specific theme, delegates are encouraged to make new contacts and some will make short pitches about their company, its products and services plus news announcements! The breakfast meetings have proved to be very popular and currently run on a 2 monthly basis attracting an average of 40 people each time. New contacts can lead to new opportunities and new business. All are welcome.

Common Interest Groups - Chemicals Northwest's **REACH** group has followed closely the developments within this complex and long term piece of legislation. The initiative allows the sharing of experience, best practice and knowledge between manufacturing, supply chain and support service providers, all with a keen interest in REACH. The group meets three times a year and now has a membership of over 50 companies.

CNW started the **Brexit** user group straight after the referendum in 2016 and it is gaining more and more support from membership. Whilst there is still uncertainty, many businesses will be looking to the future impacts, so we are enabling all interested parties to meet and discuss in more detail their common issues and concerns. Up to date information, expert insights and reports form the basis of each agenda, which will run parallel to the national work carried out by CIA.

elements magazine - CNW produces an informative quarterly magazine called elements which contains the latest round up of member news, specialist features and 'spotlights' on new member companies. This is a great opportunity to establish an association between your organisation and important sector issues, by contributing free editorial and press releases. Companies who do business in the chemicals sector may also wish to look at advertising options. The CNW sector directory is now integrated into elements.

Website - Visits to the CNW website have almost doubled in the past 12 months. The website is regularly updated with industry news and the events programme. Companies are increasingly using it for enquiries and advertising. There is an efficient "e-shot" function which allows direct messaging to our contacts list. Viewers of the directory pages can search the whole of our supply chain providers to find where to buy products and services.

LinkedIn - The Chemicals Northwest LinkedIn group was created in the latter half of 2010 and has an ever increasing membership, with over 1300 members now connected. The group provides the opportunity for chemical industry professionals to share ideas and knowledge.

Twitter - The CNW Twitter account is growing, so to hear about the latest news from CNW and the wider sector, why not follow us.

In addition we'd be happy to re-tweet any news or updates that members themselves tweet.



International Trade News

UK Trade Policy. It seems straightforward but it's not. Having left the EU in January 2020 the UK, for the first time in 45 years, is now responsible for setting its own trading rules and policies. The UK is already negotiating bilateral Free Trade Agreements with the US, Japan and Australia and we hope to join the CPTPP (11 countries spanning the Pacific) as part of a policy to deliver 80% of UK exports being covered by FTAs in three years. It's an ambitious goal but only achievable if the UK secures a deal with the EU by the end of the implementation Period (31 December 2020).

You might wonder what impact COVID 19 has had on trade policy? In terms of Brexit the UK has made it clear that it will not seek an extension to the IP nor will it respond positively should the EU request one. Neither side show appetite for such a move and industry, after 4.5 years of uncertainty, would prefer clarity to any further extension. COVID 19 has impacted on some elements of government policy. There is recognition that global supply chains, specifically in food and medicines, proved robust through the pandemic, largely due to the heroic efforts of the food production, logistics and haulier industries. From our perspective we were delighted that the chemical sector was recognised as critical and its workers essential allowing companies to remain operational throughout. Many members switched production to PPE and sanitizer but you'll recall that genuine shortages were experienced and the Government is now looking at what products the UK ought to produce closer to home to ensure that security of supply during any future national emergency. We are keen that onshoring of supply chains does not cross the line into protectionism as experience shows that protectionism impacts negatively and significantly on growth.

So what is the Government doing to prepare companies for the future trading environment. One of the most obvious trade tools is tariffs. In June the Government released the UK Global Tariff <https://www.gov.uk/check-tariffs-1-january-2021> following a short, three-week public consultation. The Government objective was to simplify the tariff system, remove tariffs where there was not a significant UK producer and where those imported materials were critical inputs to manufacture. We saw some chemical tariffs liberalised, others trimmed but I would encourage you to review what tariffs are proposed on your key materials using the tool in the link above. Government has also put in place a Trade Remedies Authority, this independent body will look to ensure all imports comply with global trading rules established by the WTO. The rules ensure that overseas goods are not being dumped on the UK market or are priced unreasonably low due to state subsidies. In August the Government launched the Border Operating Model <https://www.gov.uk/government/publications/the-border-operating-model> The model explains what you need to do to prepare to export/import as a third country outside of the EU after the IP ends. It is not a small document but critical reading. Good luck.

Should you need anything explained do contact me at cranshaw@cia.org.uk

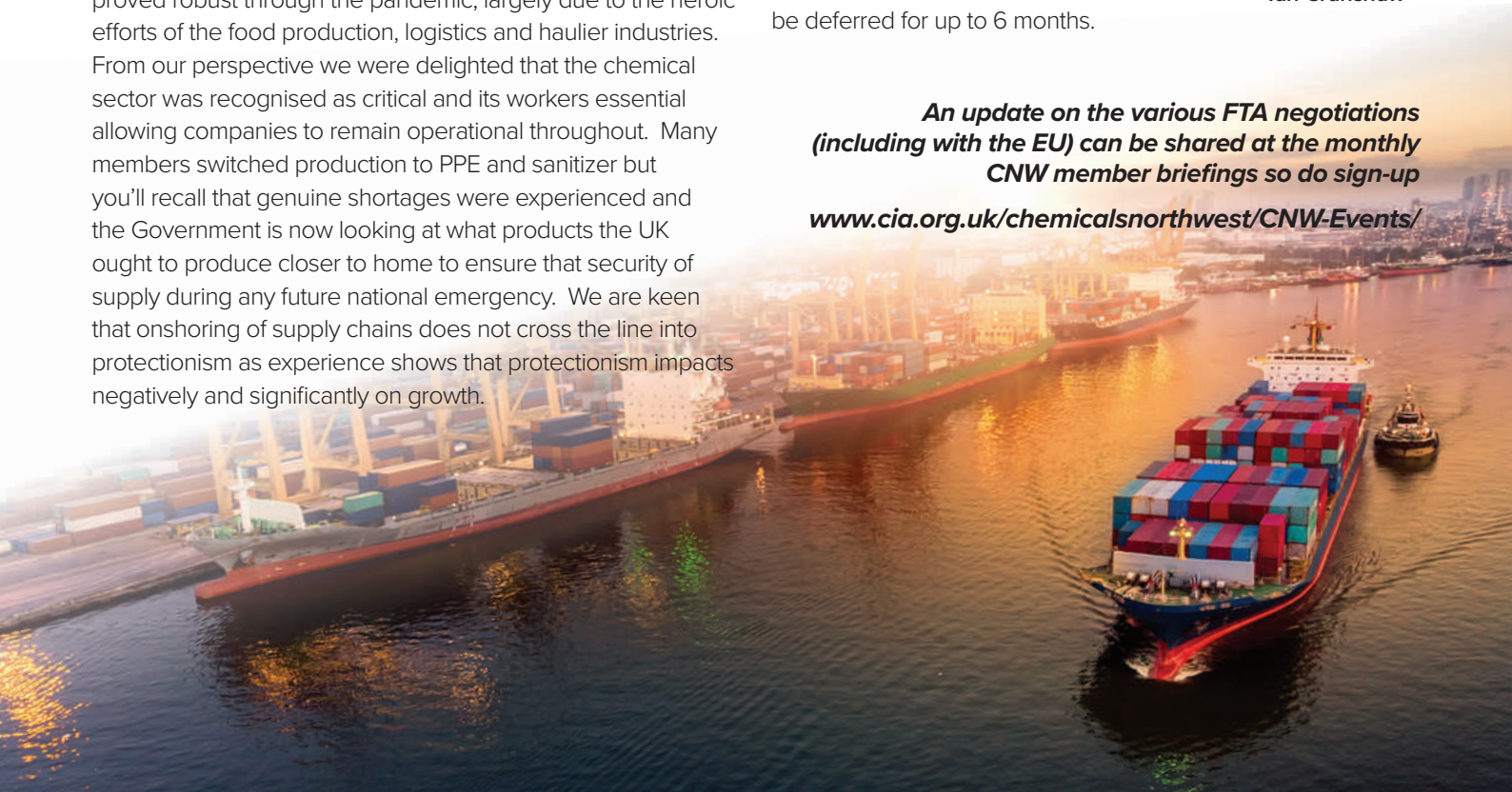
The Government did introduce a range of easements on the UK side to help companies with exports. The easements include help with export documentation and a VAT deferral system that delays payments for up to six months. Imports tariffs can also be deferred for up to 6 months.



Ian Cranshaw

An update on the various FTA negotiations (including with the EU) can be shared at the monthly CNW member briefings so do sign-up

www.cia.org.uk/chemicalsnorthwest/CNW-Events/



Four months to go: Brexit business concerns

Over the past month, interest in Brexit has picked up again as thoughts turn to the end of the year. With the end of transition creeping ever closer, Tom Rathborn shares some of the trends he's seeing in the market.

No one knows how exactly Brexit will pan out.

That said, the default position of No-Trade-Deal is the most damaging to many organisations. I have, however, seen a growing tendency of businesses to ignore the probable and instead, create scenarios that suit their needs. It's important that wishful thinking does not cloud your planning.

Scenarios need to be realistic to be valuable. Plan for the worst, hope for the best.

Here are a few other things I have noticed.

A 'wait and see' approach to Brexit prevails

As the fourth Brexit deadline nears, many businesses are loath to do too much, having previously been burned.

When you have spent significant sums in advance of previous deadlines, only to see extensions and fudges, there is an understandable reluctance to act now in advance of yet another one.

We are seeing a number of businesses say 'we are waiting for further clarity' when pressed about their plans. For some, this means they have taken all the necessary steps to continue business-as-usual in the event of No-Trade-Deal. They're happy to absorb some extra costs, but comfortable to wait before making drastic change. Others are waiting on more information before acting at all.

Though understandable, it is vitally important that organisations are ready for change come January 2021. Many steps, such as gaining EORI numbers or VAT registrations, are relatively inexpensive, and can be done ahead of time.

For those who can navigate the disruption in the short term, waiting makes sense. For others, it may be too late.

Best in class planning

It has been great to see businesses' taking Brexit seriously and planning accordingly, but it's clear that some planning has been rather disjointed.

In some cases, this is led by a certain department; often, procurement or supply chain. They can be all over the impact on them, but not joined up into other teams.

Where organisations do not have a joined-up, centralised approach, things can be missed, and efforts duplicated.

The best plans we have seen...

...have senior buy in

It is vital that the top of the organisation is engaged and leading the work. They give it credibility, provide oversight and, importantly, can make big decisions.

...capture everything in a central document

It may sound obvious, but simple planning documents that outline the risks and owners can be incredibly valuable. With the added disruption of COVID-19, many people have either left firms, changed roles or are off sick. Ensuring risk owners and their stand-ins are identified clearly and up to date is vital.

...consider the business end-to-end

Think about how your customers and suppliers view your business, not just the business functions you operate in.

COVID-19 highlighting potential people issues ahead of Brexit

As the pandemic spread and the UK went into lockdown, employees began remote working. With no requirements to travel to offices, many businesses have found their employees working from new locations, occasionally overseas.

Employees logging in from overseas to work may cause challenges for their organisations, such as creating a taxable presence and possible regulatory compliance failures.

Brexit will likely add additional complexity as the EU Free Movement of People ends for UK nationals. UK nationals working remotely from the EU post-transition will face additional barriers around their right to work. The pandemic has enabled organisations to understand whether this risk applies to them, what size of problem it creates and come up with solutions and policies ahead of time.

At Grant Thornton, we continue to work with businesses on their Brexit preparation and would welcome to hear how your business is planning for Brexit.

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RISK & HAZARD MANAGEMENT



"We cannot solve our problems with the same level of thinking that created them." Albert Einstein

Understanding and facilitating the effective management of risk is our core business. Our expertise covers the full range of risk assessment and management services across:



Safety Risk



Business Risk



Environment Risk

Only when the risk facing an organisation is well understood can it be effectively managed. Key to the successful identification, assessment and management of risk is engagement with the right people, using the right processes at the right time. We believe we are different to many of our competitors and our approach is distinctive, we don't always walk the well-trodden path but look at each client's particular risk context and develop a tailored solution, working in partnership with our client.

We work across all aspects of risk, from Quantitative Risk Assessments and Predictive & Consequence modelling, through to the 'softer' risks which may affect an organisation's reputation.

Confusion over Risk Criteria

The 'how' and 'when' of risk assessment is widely known and well described, but the 'so what' part seems to be applied with much less consistency. To determine if the level of risk is acceptable or where additional control measures should be implemented, some sort of criteria is used, often embedded in a risk matrix. Where do those boundaries come from though? And how often do we step back and consider if they are appropriate?

These might sound like odd questions, but when you consider that a lot hinges on these seemingly simple things, they are quite important. Risk criteria are used in all sorts of ways, but ultimately they inform the amount of effort we put into analysis and the amount of resource we expend on risk management, so there is a lot of weight put on them. They are the lynch pin of risk management, yet so often we find that their origins are long forgotten.

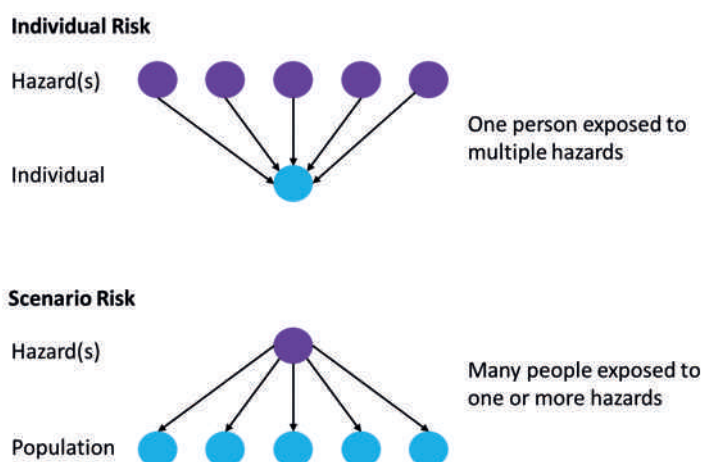
Quite often we find that a single set of criteria is being used for a whole myriad of situations, perhaps not helped by the loss of original intentions. Certainly, if you don't know where they came from, you won't be in a position to defend their use as appropriate for your assessment.

There are many types of assessment, and depending on the type of risk being calculated, we need to be sure that we are comparing the result to appropriate criteria, or we won't be comparing apples and apples. This could undermine our whole risk management decision making process.

The most widely talked about risk criteria is the Tolerability of Risk 'TOR carrot' from R2P2. This defines criteria for Individual Risk. However, Individual Risk is probably not the type of risk you have calculated. Especially if you have:

- Risk ranked an event in a HAZOP
- Estimated the risk of a scenario in a LOPA
- Focused on the risk from a specific piece of equipment
- Used a risk matrix

In fact, only if you have understood all of the hazards impacting an individual, will you have calculated individual Risk. It is quite likely that you have calculated a form of societal risk or group risk, for ease of communication we will call it 'Scenario Risk'. The concept of Individual Risk versus Scenario Risk is illustrated in this diagram.



Scenario Risk cannot be compared to Individual Risk tolerability criteria, and tolerability criteria for Scenario Risk cannot be derived from the Individual Risk criteria.

For these reasons it is incorrect to look at a risk matrix or LOPA target and expect to see the one fatality box align with the tolerability limits shown in R2P2 for Individual Risk. Yet so often this is what even experienced practitioners and the regulator trip up over.

If we want to use our Scenario Risk as calculated:

- We must define our scenario risk criteria
- We must ensure it is calibrated to account for other events on the site

If we want to use Individual Risk criteria:

- We must adjust our Scenario Risk to account for the number of individuals 'sharing' the risk
- We must adjust our criteria to account for other events that may impact that individual

Either route is acceptable, so long as we know what we have done and why.

If we are using corporate criteria that we have been handed, we need to understand how these adjustments have been made in order to match the correct criteria to the correct situation.

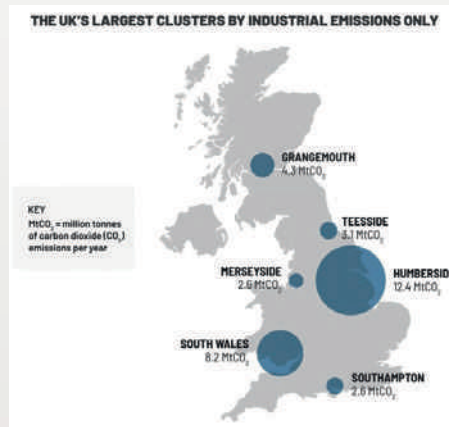
We need to be confident in our criteria. It is important that we challenge the status quo, and truly understand. There is so much that hinges on it.

Carolyn Nicholls - enquiries@ras.ltd.uk

Decarbonisation

Emerging into a post-lockdown world of reduced demand and disrupted supply chains, it may be difficult to remember that climate change was one of the headline issues at the turn of the year. Decarbonisation is one part of the climate agenda and - for those who have attended a few on-line seminars during lockdown - hydrogen is not the only game in town.

The UK Government is investing to support industrial decarbonisation through University-based interdisciplinary research centres, such as The Industrial Decarbonisation Research and Innovation Centre (IDRIC) at Heriot-Watt University in Edinburgh. Part of IDRIC's role is to work closely with the UK's 6 major CO₂-emitting industrial clusters to address the challenges of industrial decarbonisation. These include Merseyside



"Source idric.org" (Industrial Emissions UK.jpg)

How can my company decarbonise?

1. Become more energy-efficient

Energy savings lead to CO₂ emissions reductions. Clean Growth UK <https://www.clean-growth.uk/> whose northern hub is at Liverpool John Moores University, is one of several "free at the point of use" initiatives to help enhance resource efficiency: water, raw materials or energy. LJMU also offers support outside the CGUK wrapper, as do many other Universities.

CGUK offers workshops (formerly 2-day face-to-face, now virtual and spread over four weeks) followed by a free audit, which often find savings with zero or minimal capital investment.

Investing in Combined Heat and Power (CHP) often has a 2-3-year payback, according to Alex Marshall, Group Marketing and Compliance Director of CNW Member Clarke Energy at a recent webinar. CHP reduces CO₂ emissions relative to electricity supply via the grid and provides stability against electricity power outages.

2. Substitute (Fuel Switching)

Air, water and ground-source heat pumps are all available for domestic and commercial space heating. Small scale on-site renewable electricity could include wind turbines or the almost ubiquitous solar PV array on the roof. Many of these can be purchased on the internet, but they can also be optimised with expert support (see above), which could include an assessment of batteries or other energy storage solutions.

3. Re-model the process

At the simplest conceptual level, this can involve directing waste process heat into space heating. More radically, it involves complete process re-design.

- Glass Futures in St Helens will establish a 30 tonne/day low carbon glass-melting furnace, supported by the Liverpool City Region and St Helens Borough Council.
- BASF is developing a (green) electrically-powered steam cracker. According to BASF's Corporate Affairs & Sustainability Director, Geoff Mackey, "If we could utilise renewable electricity instead of the natural gas to heat our crackers world-wide, BASF's CO₂ emissions could be dramatically reduced, perhaps by as much as 90%."
- Steel producers are considering molten oxide electrolysis (the process by which aluminium is manufactured) as an alternative to smelting iron oxide with coke.

This is an interesting case in point. As energy production becomes decarbonised, the products of the chemical reactions become the major source of carbon dioxide, so why not...

4. Re-use the greenhouse gas

Utilisation is the "U" that has appeared in the last few years as CCS (Carbon Capture and Storage) has transformed to CCUS.

The UK-government supported Sustainable Aviation Fuel initiative, has supported several waste gas (usually CO/CO₂ mixtures) to hydrocarbon processes towards commercialisation.

See <https://admin.ktn-uk.co.uk/app/uploads/2020/02/SAF-SIG-Report-Final.pdf>

Locally, Tata Chemicals Europe received planning permission and UK Government financial support in mid-2019 to build a demonstration-scale carbon capture and utilisation plant in Northwich. Flue gases from its CHP plant will be captured and CO₂ extracted for use in food and pharmaceutical grade sodium bicarbonate manufacture.

According to Geoff Mackey, BASF is looking at chemistry to utilise CO₂ as a feedstock for sodium acrylate manufacture.

Where can I start? Industrial Energy Transformation Fund

Innovate UK is running a competition with two strands on behalf of BEIS, with up to £30m available.

- "Studies" cover feasibility or engineering studies to develop either an energy efficiency or a deep decarbonisation project that enables possible subsequent deployment.
- "Deployment" projects must deploy technologies to improve the energy efficiency of industrial processes.

Applications for both close on 28 October.

<https://apply-for-innovation-funding.service.gov.uk/>

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a freelance science and technology writer
and Secretary of the Chemical and Industrial
Consultants Association (CNW Member).

The INOVYN Hydrogen story

Richard Stevenson, Hydrogen Business Development Projects

The debate is not really Betamax versus VHS; Hydrogen versus Electric or even Green Hydrogen versus Blue Hydrogen. In the fight to control global warming, climate change and improve air quality then as a society we are going to need a range of energy solutions.

The transition to a zero-carbon economy is going to need significant volumes of hydrogen to replace natural gas and diesel. Whilst Green Hydrogen, from the electrolysis of water using renewable electricity, is the most attractive option it is currently not feasible at the scale of energy required to replace our current energy use in the timescales projected without significant investment. We do not have 100% 'renewable' energy on our electricity grid today, to multiply this by a factor of 3 (or even 10 in winter) in the coming decades will be a major challenge. As part of the transition to a healthier, net zero economy then we will need GigaWatt scale electrolysis cellrooms to produce the associated hydrogen; given the challenges is easy to see why so much effort is needed to accelerate the proposed programmes providing both the energy needed, the infrastructure and ultimately the necessary electrolysis capacity to satisfy demand.

On a parallel path we have Blue Hydrogen, produced from the reformation of natural gas with the carbon capture and storage (CCS) of the resultant CO₂. Many experts agree that it is likely that Blue Hydrogen will make up typically 80% of the total hydrogen needed by 2050. The natural gas industry is already well placed to deliver the quantity of energy required, at the flexible rates required, therefore, it is just a matter of transitioning this infrastructure to convert the gas to hydrogen along the way and capture the CO₂.

As well as hydrogen having a key role as an energy carrier for domestic, commercial and industrial heating the interest and potential for hydrogen in transport has grown significantly over the last few years. Hydrogen has a growing role to play not only in cars and Light Goods Vehicles but hydrogen can be a viable option for the heavier end of road transport, off-grid trains and also shipping. Whilst electric cars are starting to penetrate the market and provide a viable solution for domestic travel the commercial use of battery electric double decker buses, HGV's, trains and ships is far more problematic; with the weight of battery exceeding the payload, long charge (refuelling) times and vehicle range all significant challenges. This is an area where hydrogen powered vehicles can provide a key link in our transport chain, not replacing electric vehicles but part of the required range of solutions.

Delivering solutions to challenging problems is nothing new to INEOS and at INOVYN, part of the INEOS group, we have a long history and considerable experience (over 100 years)

in the safe manufacture and handling of chemicals and gases including hydrogen. We have been operating chlor-alkali cellrooms that co-produce hydrogen across Europe and have been, storing, supplying and using hydrogen as a chemical feedstock and energy source for decades. So for us, hydrogen has always been a very important part of our portfolio and for many years used as a green energy source, for example in our manufacturing complex at Runcorn.

Whilst much of the focus is on the production of hydrogen a key element will be the storage of hydrogen, just as natural gas storage is essential to the domestic heating network, hydrogen storage will be essential to the future hydrogen economy and network. At INOVYN we are already looking at a range of hydrogen storage options in salt caverns at our site in Cheshire. A single salt cavern is capable of storing 50GWh of energy, as hydrogen, which is 400 times more than the largest Lithium Ion battery storage project in the world, and at a fraction of the cost.

At INOVYN Runcorn, as a member and supporter of a number of North West (NW) based hydrogen groups and projects, e.g. the North West Hydrogen Alliance and North West Net Zero we are keenly looking at how we are aligned to and can harness the strength of the NW to deliver and provide a viable network, multiple supply routes and a resilient system for the use of hydrogen to provide the clean, healthy energy of the future. The NW is ideally positioned to be a key hydrogen generation, storage and base for the successful deployment and transition to a hydrogen economy within the UK.

Process safety considerations for

By Clare Dunkerley, Process Safety Consultant, Otto Simon Limited

In 2019 the Committee on Climate Change (CCC) issued a report¹ to the UK Government recommending a new emissions target for the UK: net-zero greenhouse gases by 2050. The UK Government and the devolved administrations committed to this new target as recommended by the CCC.

The switch from natural gas to Hydrogen as a fuel source is key part of the UK's plan to honour the net-zero commitment. Hydrogen has the technical potential to reduce emissions from most forms of industrial combustion, and a report commissioned by the Committee on Climate Change published last year also showed that low-carbon hydrogen has a unique role to play in reducing emissions from direct firing. HyNet is playing a key role in proving this technology, with hydrogen production due to come online by 2025. Nearly £13 million of government support² has been provided to develop the design of the hydrogen production and undertake industrial fuel switching trials.

From both a technical and economic point of view, the transition to Hydrogen as a fuel source is a clear part of the roadmap to net-zero. The North West Chemical Industry is in a prime position to hit the ground running. Being geographically close to innovative Hydrogen Projects, such as HyNet³ and HyDeploy⁴, puts members of Chemicals North West close to the growing expertise and skills in the Hydrogen arena.

Safe Handling of Hydrogen

Designers and operators have a duty of care for their employees, visitors and members of the public near the facilities they build and operate. Past Hydrogen explosion events have alerted the public to the potential hazards associated with Hydrogen. Care must be taken to reassure potential users of Hydrogen and neighbours of Industrial Hydrogen users that all necessary measures are being taken to ensure their safety.

It should be no surprise that the key to preventing Hydrogen accidents is no different to preventing other high hazard incidents that already exist in Industrial Chemical Facilities today. The established methods of hazard identification, risk assessment, and applying the hierarchy of controls to ensure the overall risks are at a broadly acceptable level, or as low as reasonably practicable (ALARP), are still applicable. Understanding the inherent hazards associated with Hydrogen is a good starting point to enable comprehensive risk assessment and ensure the design and operation of facilities to prevent, control or mitigate against Hydrogen hazards.

In the UK, the primary regulations that will govern the

handling of Hydrogen and the associated infrastructure are DSEAR, COMAH, PER and the Carriage of Dangerous Goods Regulations all of which arise from implementation of EU Directives. There are three threshold values for Hydrogen Inventory that should be taken into account if considering the transition to Hydrogen:

1. The controlled quantity of Hydrogen for The Planning (Hazardous Substances) Regulations 2015 is 2 Tonnes.
2. Hydrogen is a named dangerous substance under COMAH regulations.
3. The threshold quantities are 5 Tonnes (lower tier) and 50 Tonnes (upper tier).

Physical Properties of Hydrogen

The inherent physical properties of Hydrogen provide guidance as to considerations in design.

- Hydrogen is colourless, odourless, and tasteless; making it difficult to detect.
- Hydrogen is non-toxic, does not support life and may act as an asphyxiant. Liquid hydrogen can produce cold boil-off gas, which can produce severe burns upon contact with the skin.
- Hydrogen is extremely flammable in air; the ignition energy is lower than methane and it burns in air with a very hot and almost invisible flame. It has a greater propensity to detonate than mixtures of air with more common flammable fuels.
- Maximum burning velocity of a hydrogen-air mixture is about eight times greater than those for natural gas.
- The low density and low viscosity makes it difficult to prevent Hydrogen leaks. If a hydrogen leak occurs in an open or well-ventilated area its diffusivity and buoyancy will help to reduce the likelihood of a flammable mixture forming in the vicinity of the leak. Hydrogen is likely to pool at high points, such as roof apices. Hydrogen leak detection should be placed accordingly.
- The dispersion behaviour of a liquid release of hydrogen will be different from a release from gaseous storage. The gaseous hydrogen would be initially very cold, denser than air and start accumulating at low level.
- Liquid Hydrogen carries a potential for rapid phase transition (RPT) explosion.
- Spills of liquid hydrogen can result in air condensing out in and around the pool of liquid.

Figure 1: Artistic Impression of Hydrogen Flame vs. Carbon Flame

using Hydrogen as a fuel source

Hydrogen's inherent physical properties, much like other flammable compounds such as natural gas, can be safely managed through robust design protocols.

Hazardous Area Classification

Work carried out by HSL for the HyDeploy Trial at Keele University looked at concentrations of up to 20% Hydrogen blended in Natural Gas (NG). The results showed that volumetric release rates could be up to 10% higher for the blend than NG, and dispersion distances (to ½ LFL) could be up to 15-25% further for the blend. HSL proposed pragmatic, conservative modified criteria to be applied at HyDeploy to the Natural Gas Standard IGEM/SR/25 for the blend. Further work will be required to allow these criteria to be used outside the HyDeploy Project.

BS EN60079-20-1:2010

- NG with up to 25% hydrogen is Group IIA
- Hydrogen is Group IIC
- Both NG and hydrogen have a T1 temperature class

Figure 2: Hydrogen Classification to BS EN 60079-20-1:2010

In contrast, standards addressing Hazardous Area Classification for pure Hydrogen or Hydrogen blends above 20% are in wide use already. The Energy Institute (EI) Model Code of Safe Practice EI 15⁵ guides that any mixture containing above 30% volume Hydrogen should be treated as Hydrogen. The corresponding EI representative fluid category is G(ii). The HSL tool, Quadvent⁶, is also recommended for classifying zones and calculating extents.

Industry Codes and Standards

A number of organisations provide internationally recognised codes with respect to Hydrogen, including; the European Industrial Gases Association (EIGA); the National Fire Protection Association (NFPA) and; the American Compressed Gas Association (CGA). In the UK there is the British Compressed Gases Association, and a number of gas suppliers (e.g. BOC) have their own internal standards. These are particularly useful for identifying requirements for standard separation and segregation distances for hydrogen storage.

Implementing a Hydrogen Economy

Understanding the risks involved with using Hydrogen, and ensuring the necessary steps are taken to mitigate and control the hazards, is therefore vital to enabling the use of Hydrogen as an alternative fuel source.

Further information about implementing a Hydrogen Economy in the North West can be found in the HyNet website, or from

the North West Hydrogen Alliance; an organisation created to promote and influence the delivery of a hydrogen economy in the North West region through collaboration between industry, academia and government.

About the Author



Clare Dunkerley is a Process Safety Consultant at Otto Simon Limited. Clare is a TUV Rheinland certified Safety Instrumented Systems Engineer specialising in Functional Safety, including Functional Safety Management, LOPA, SIF architecture design, software specification and functional safety assessment. Clare has a background in DCS and

process design engineering, and has worked as lead engineer for relief system studies for multiple clients and DCS and SIS application design engineer for plants in the chemical, petrochemical and waste management sectors.

An active member of the North West Hydrogen Alliance, Otto Simon Limited is working at the forefront of technical innovation for the Hydrogen market. We are providing engineering expertise and project management services to develop feasibility, commercialisation, and process safety studies for utilising blended hydrogen and for the re-purposing of equipment to use pure hydrogen as a fuel source for industrial sites in the North West.

Resources

<https://hynet.co.uk>

www.nwhydrogenalliance.co.uk

www.ottosimon.co.uk

¹ <https://www.theecc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/>

² <https://www.gov.uk/government/publications/hydrogen-supply-competition/hydrogen-supply-programme-successful-projects-phase-2>

³ <https://hynet.co.uk/>

⁴ <https://hydeploy.co.uk/>

⁵ <https://publishing.energyinst.org/topics/asset-integrity/ei-model-code-of-safe-practice-part-15-area-classification-for-installations-handling-flammable-fluids>

⁶ <https://www.hsl.gov.uk/publications-and-products/quadvent-2>

North West is home to the leading hydrogen and carbon capture project in the UK - HyNet

As the news coverage of a potential 'green Arecovery' grows daily, it is good to know that the North West is right at the heart of this. In fact, it's ideally placed to lead the UK into a more prosperous and environmentally friendly future.

At the centre of this vision is a project called HyNet, created by the UK's largest gas distribution network Cadent in partnership with green energy consultants Progressive Energy Ltd.

HyNet proposes that, with government funding and private investment, we create hydrogen production facilities in the region, together with a major pipeline to form the spine of a network that will deliver hydrogen across the North West.

This will provide zero carbon energy to industries including those that need very high temperatures in their production processes. The surplus hydrogen would be used to provide blended gas heat for around two million homes in the region, reducing carbon emissions from domestic heating at the same time – without customers having to make any changes to their appliances.

The North West is the ideal location for this highly innovative proposal. The high concentration of industry in a relatively small geography means there is consistent gas demand, avoiding the need for hydrogen storage (which can be expensive).

The hydrogen will be produced from methane and biomethane using a process called autothermal reforming (ATR). This enables 97% of the CO₂ byproduct to be captured.

What will happen to this CO₂? Once again, the North West has the answer: The proximity and timing of the depletion of the Liverpool Bay oil and gas fields means that these can be repurposed as a 130m tonne CO₂ storage facility underground; there is no need to build new facilities or scrap the old ones – and the CO₂ never reaches the atmosphere, so is harmless.

Finally, the support within the North West – from its political leaders to its industrial and business stakeholders – is a huge factor. The region has a proud history of bold innovation and industry and this positive support for HyNet will be a major factor in its success.

HyNet also represents excellent value for money and is one of the lowest cost options being considered by government at the moment. The estimated infrastructure investment for

the full HyNet project is around £0.9 Billion. This includes hydrogen production, pipelines and the full Carbon Capture Utility and Storage chain. In return for this investment, the project will deliver CO₂ savings of 1m tonnes every year and over 5,000 jobs between now and 2025 when it would launch. It's also estimated that it would provide £31bn in gross value added for the UK.

No wonder, then, that a recent report from the All Party Parliamentary Group on Hydrogen ('How the UK's hydrogen sector can help support the UK's economic recovery') noted that HyNet "has gained significant momentum and is now viewed as the leading hydrogen and CCUS project in the UK today".

HyNet is an excellent example of repurposing existing infrastructure (which has had huge investment during its lifetime) and thereby keeping customer disruption to a minimum, as well as continuing to get value from that investment. It's a classic example of how the North West can adapt to changing circumstances and come out of it stronger and in great shape for the future.

The HyNet consortium consists of Cadent, Progressive Energy Ltd, Essar, CF Fertilisers and the ENI.

www.hynet.co.uk

The future of UK carbon trading

The UK will leave the EU Emissions Trading Scheme (EU ETS) at the end of this year, when the Brexit transition period comes to an end. That will leave a big gap in the mechanisms needed to achieve net zero carbon emissions by 2050, and consequently a consultation exercise was held in 2019 on the future of carbon pricing in the UK. Now the Department for Business, Energy & Industrial Strategy and the devolved administrations have published their response to the consultation and their proposals for replacing the EU ETS with a UK 'cap and trade' scheme.

The plan is that the new UK ETS will take over from the EU ETS in January 2021, and that it will be very similar in most respects to Phase IV of the EU scheme which starts on the same date. Depending on the outcome of the trade agreement negotiations with the EU, it could even be linked to the EU ETS, with compatible carbon allowances. Like that scheme, it will cover energy intensive industries, power generation and

certain aviation routes, and participants will have to obtain most of their allowances via auctions, although some will continue to be allocated for free to new entrants and where necessary to prevent carbon leakage. But additional sectors could well be included within a few years.

One key difference between the EU ETS and the proposed UK scheme is that the number of allowances issued will initially be capped at only 95% of what the UK's notional share of the EU ETS cap would have been, in order to show "greater climate ambition from the start". The cap for Phase I, which runs until 2030, will be adjusted in the future to provide a trajectory to net zero. In addition, there will be an Auction Reserve Price of £15 in the early years to provide a minimum carbon price, irrespective of the demand for allowances.

Despite publishing these proposals, the government is still hedging its bets by working on a potential carbon emission tax that would be an alternative to a UK ETS. A consultation paper on such a tax is expected later this year.

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All you need to know about

Our members currently report energy and carbon data through a number of mandatory carbon reporting schemes, with differing goals, scope and qualification criteria. As an industry body representing the chemical sector, we feel that complying with numerous schemes stretches staff resources and creates significant expenditure, disproportionate to the value added. Brexit gives us the perfect opportunity to reassess these complex and overlapping requirements, which add burden to UK businesses at a time of historic uncertainty.

The EU Emissions Trading System (EU ETS), is the main measure in the government's toolbox for tackling industrial carbon emissions, by creating a cap on total emissions which reduces year-on-year, and allowing companies to trade emission allowances beneath that cap. Theoretically, this creates a price for emissions according to demand and supply, allowing the carbon market to find the lowest cost emission abatement investments. However, successive interference from rule-makers has seen additional mechanisms imposed on the market, with the aim of driving up the price of emissions, regardless of the cap and demand. The UK is set to leave the scheme in January 2021 and current UK participants will instead qualify for either a UK ETS (perhaps linked to the EU ETS) or a Carbon Emissions Tax. The final scheme is subject to ongoing negotiations with the EU.

Another reporting regime coming down from the EU is the Energy Savings Opportunity Scheme (ESOS). The government established ESOS to implement Article 8 of the EU Energy Efficiency Directive (2012/27/EU). The scheme obliges businesses to report site and transport emissions for UK operations, and to perform an energy audit once every four years. The government intends to maintain ESOS requirements, even after we leave the EU. The Department for Business, Energy and Industrial Strategy (BEIS) is expected to consult on changes to the scheme at the end of 2020.

The Climate Change Agreements (CCAs) are a UK based, voluntary scheme, which provide a significant discount on the Climate Change Levy (CCL) in exchange for signing up to energy efficiency targets. In reality, the benefit they provide - i.e. a reduction to the CCL charged on a site's energy bills - is such that the majority of chemical sites must sign up and report to stay competitive. The government this year consulted on an extension of the CCA scheme to 2025, adding a further two-year reporting period (Target Period 5) covering the years 2021-2022. With the scheme extension, if a site reports data for Target Period 5 and meets its targets, or pays a buy-out fee for any shortfall, then the site will continue to qualify for CCL relief up until March 2025.

Streamlined Energy and Carbon Reporting (SECR) is the most recent addition to the pack. Quoted companies, as well as unquoted, "large", UK-based companies, are required to prepare and file an annual 'Energy and Carbon Report' with Companies House. The scheme replaced the Carbon Reduction Commitment (CRC) scheme and Mandatory Greenhouse Gas Reporting for quoted companies, hence the "streamlined" in the title. Its main aim is to make energy and carbon disclosures transparent to investors, in addition to the businesses themselves.

Beyond mandated carbon reporting requirements, multiple voluntary approaches and frameworks exist to monitor, report, validate and set targets for GHG emissions. Many of these have relevance to the financial and non-financial disclosures used in communications to company stakeholders such as investors and shareholders. Some examples include:

- Task Force for Climate Related Financial Disclosures (TCFD) Recommendations: the TCFD resides with the Financial Stability Board, led by the G20 heads of state and central bank governors. Published in 2017, the general recommended disclosures cover governance, strategy, risk management, and metrics and targets. Further detail is borne out through sector specific recommendations, acknowledging that the chemicals sector would benefit from further guidance. Whilst the TCFD recommendations are largely voluntary in the UK at present, the Financial Conduct Authority

carbon reporting . . .



is consulting until October on proposals intended to increase the mandatory implementation of the TCFD recommendations, particularly by premium listed companies. CIA is working with members to understand the impacts and identify our response.

- Science Based Targets initiative (SBTi) Chemical and Petrochemical Sector Guidance: SBTi was established by the Carbon Disclosure Project, the World Resources Institute, the UN Global Compact, and the World Wide Fund for Nature. This involves committing to set a target in line with the Paris Agreement, developing the target, submission for validation and eventual approval. Sectoral guidance exists for some industries and recognising the unique features and needs of the chemical sector, guidance is under development to assist in the approach to the above process and a summary report should be available by the end of

the year.

Inclusion of Scope 3 GHG emissions (all GHGs not related to heat and electricity generation)

is particularly challenging, as well as incorporating the positive GHG impacts that result from chemical industry products such as through improved energy efficiency of buildings by advanced insulation materials.

In addition to the above, several frameworks address public disclosures related to social environmental and economic impacts. These include: The Global Reporting Initiative (GRI), Integrated Reporting (IR) and the Sustainability Accounting Standards Board (SASB).

In short, the carbon reporting landscape is already complex and it is only getting more complicated. At CIA we are urging the government to use Brexit and the net zero target as an opportunity to re-evaluate, rationalise and streamline climate policy. Energy-intensive foundation industries need cost-effective policy with realistic and achievable goals emission goal, to maintain their competitiveness whilst they invest to reach net zero.

For further details please contact Richard Woolley (WoolleyR@cia.org.uk) or Peter Walters (WaltersP@cia.org.uk)

Hazards30

26–27 November 2020, Virtual

Due to the uncertainties caused by the ongoing pandemic, our annual *Hazards* conference will be delivered virtually this year on 26–27 November 2020, making process safety knowledge-sharing more accessible than ever before.

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Preparing for a Safe Hydrogen Economy

With a view to meeting global decarbonisation objectives, the UK Government has invested in the development of a hydrogen network. Whilst this shift to an emerging market represents many economic and climate change benefits, there are important Process Safety Management (PSM) considerations that must not be overlooked.

In commercialising hydrogen technologies and applications, all aspects of safety will be critical. Regulatory compliance will apply across many aspects of the hydrogen production, storage and distribution systems. It goes without saying that existing and potential future operations will require effective PSM.

Design Considerations

Hydrogen has a wide flammable range and an extremely low ignition temperature, along with an invisible flame. The possibility of ignition will always be present, hence most incident prevention measures are likely to centre around leak detection and preventing loss of containment events. Therefore, hazardous area classification for the safe location of electrical equipment is critical. Operators will need to identify hazardous risks through Hazardous Operability Analysis (HAZOP) studies, which may require Consequence Modelling or the use of Computational Fluid Dynamics (CFD) to understand potential operational and catastrophic risks.

With the potential for hydrogen to cause significant vapour cloud explosions (VCE) and fires, operators must strive to reduce these hazards to occupants housed within their onsite buildings, commonly undertaken as part of a Facility Siting Study. Building vulnerability due to these hazards need to be appropriately evaluated through Occupied Building Risk Assessment (OBRA) to accurately determine the response of the structure so that cost-effective mitigation strategies can be implemented.

To meet the economic benefits of using hydrogen as a fuel source, alternative methods of production are being sourced from what is currently known as 'grey hydrogen' and turn it into 'green hydrogen'. Grey hydrogen currently relies on natural gasses and fossil fuels for its production. To turn this into green hydrogen, we need to lower the carbon footprint and move towards Carbon Capture, Utilization and Storage (CCUS). The development of these plants in turn presents a series of design issues which need to be addressed. It is important to acknowledge that general process engineering and pipeline standards may not provide satisfactory regulatory approval

for CCUS, and while there are currently no specific CCUS standards, it is essential that plants have a thorough design review and mitigation strategy to prevent issues such as brittle fracture propagation, loss of containment and corrosion.

Construction and Commissioning

When a new hydrogen or CCUS facility or unit moves from the design stage to construction and commissioning, both inspection and witnessing of pressurised equipment to PED/ASME standards are recommended. These mandatory standards ensure the equipment complies with EU regulations; however, the use of the equipment is covered by national regulations specific to each country.

Once operational, the integrity of mechanical assets within the facility will also be an important feature in the ongoing maintenance. Asset Integrity Management (AIM) could help to expand the lifecycle of any plant by several years, increasing the profitability. Implemented management systems and audits help asset owners confirm the functionality of their equipment. Inspection Testing Preventative Maintenance (ITPM) strategies focus resources on the most important equipment failure modes, using techniques such as Risk-Based Inspection (RBI), Reliability Centred Maintenance (RCM) and Criticality-Based Maintenance (CBM).

Incident investigation techniques encompassing Root Cause Analysis (RCA) and Cultural Cause Analysis (CCA) help to maintain the plant's lifecycle. Addressing cultural safety and understanding the reasons why incidents occur will help staff adhere to process safety guidelines and decrease the likelihood of future incidents. Similarly, a proactive safety, risk and compliance management strategy considering all aspects of lowering operational and catastrophic risks can help operators address quality and reliability issues earlier to mitigate equipment failures.

ABS Group provides services that help our clients face safety compliance shortfalls, understand operational and catastrophic risk, prioritize actions and improve overall safety and reliability. For more information, contact: enquiriesuk@abs-group.com.

Chemical translation: The key to international success

The global chemical industry was reportedly worth over four trillion US dollars in 2018 (approximately three trillion pounds sterling). Imports and exports play a huge part in the success of this vast chemical industry. The value of Western Europe's exports alone amounted to almost 600 million US dollars that year.

Chemical Translation Services

In order to take advantage of the industry's booming research, manufacture, and trade, companies worldwide are turning to chemical translation services. Expanding into international markets isn't a straightforward process and professional translators can help businesses to navigate international waters.

Below, we've outlined some of the key factors that businesses should take into account when choosing a chemical translation services company.

Overcoming Translation Challenges

1. Avoiding mistranslation

Chemical translation services should only be offered by reputable companies. At best, mistranslations can cause a loss of time, at worst they can cause potentially fatal misunderstandings.

An example of the latter happened in 2017, when a Chinese pharmaceutical company misnamed an ingredient in an anti-itch product. The FDA issued an official warning and the Chinese company explained that a translation mistake had caused the issue. Misnaming ingredients, active substances and processes could lead to serious consequences for both the customers and the company.

A keyway of avoiding mistranslation is to employ a company with proven experience in the sector. Many translators will keep a glossary of specific words and phrases, maintaining consistency in single documents as well as across entire projects. These professionals will also fully understand the documents they are translating, which minimises the margin of error.

2. Meeting Regulations

Policies surrounding the research, manufacture and distribution of chemicals vary depending on the country or area. Translations of official documents, packaging, labels, etc. must conform to local rules. It is therefore advisable to select professional chemical translation services, with linguists who have knowledge of the industry.

For instance, in the European Union, the 2007 regulation REACH was established to control the protection and use of substances. More specifically, REACH stands for the 'Registration, Evaluation, Authorisation and Restriction of Chemicals'. According to the European Chemicals Agency website, the regulation "places the burden of proof on companies" who must demonstrate safety and communicate risk management measures.

3. Understanding Terminology

Translating scientific language

Scientific jargon varies between languages and even geographic regions. Entire monolingual dictionaries exist for logging and referencing chemical industry terminology. This makes chemical industry translations a complex process.

Additionally, there may be concepts without direct equivalents in the source and target languages. For example, health and safety codes, ways of working, and job roles need to be fully understood and researched before they can be translated into the new language.

Translating meanings

It may also be necessary to navigate vague texts, where meanings are either accidentally or purposefully unclear. Equally, complex documents such as patents, quality assurance documents, and hazard warnings may require knowledge of other industries.

For the above reasons, it is extremely important to choose translators who are native speakers of the target language and who have experience in the chemical industry.

How TW Languages can help

TW Languages are at the forefront of chemical translation services. We provide a fast turnaround for all documents and assign a project manager to oversee your project. As a team, we use the latest technologies and project management techniques to guide you through the translation process.

As an ISO 17100 company, TW Languages has been certified as a provider of quality translation services. This means that our work meets high standards and we also implement quality assurance procedures across our language services.

TW Languages has helped more than 200 businesses to translate approximately 40 million words in the chemical translation field; our translators are specialists in their field and yours.

Let us know how we can help you with our project by sending us a message.

Or visit <https://www.twlanguages.com/>

Be green while you clean - but protect your ideas



With the rise of hygiene concerns due to the COVID-19 pandemic, cleaning products are in high demand. However, when selecting products to clean our homes and workplaces, many of us are also concerned about their impact on the environment.

Innovators of green cleaning products face two key problems when bringing them to market for the first time. Increased hype around green products has led some companies to exaggerate their sustainability credentials. In addition, some consumers question the effectiveness of green cleaning products. The current lack of clarity about what constitutes a green cleaning product is not helping the situation. Some green cleaning products are made using chemically-synthesised substances, and others using a mix of natural ingredients. Product labelling is no less confusing, with some described as 'green' simply because they have a reduced impact on the environment, whilst others may be described as biodegradable, sustainable or even vegan.

To make themselves stand out from other green cleaning products, innovators can demonstrate their benefits in a variety of ways. For example, they might be biodegradable, which means components break down into natural by-products, or more efficient to make and use, such as concentrated cleaning products.

Despite the growing popularity of green cleaning products, concerns about their efficacy have been accentuated during the Covid-19 pandemic. With heightened awareness of the risk posed by germs and viruses, product efficacy has become an even more important consideration for many consumers. While this is understandable, it is also true that choosing products

that are less harmful to the environment and employing a bit of 'elbow grease' can often achieve the same result.

Consumer concerns and perceptions should be considered carefully during product development. For example, seeing a product foam up or feeling an intense clean smell, are sensory cues that can be missing from some green products. Soap suds is a good example, the reaction gives people the confidence that a surface is clean. For the chemical engineer, this presents a problem - how to achieve the same effect without the use of environmentally damaging foaming detergents?

Many businesses are innovating products with these consumer concerns in mind. There's Xeros, with its new washing machines with polymer balls; Ecozone, creating detergent-free washing machines and dishwashers, and P&G, using a lower concentration of surfactant in their cleaning products.

These companies and many more rely on patent protection to support their new product development strategies. In particular, patents can help them to differentiate their products at the same time as protecting their technological innovations on route to market. Early-stage patent protection should be sought to minimise the risk of ideas being copied or competitors getting to market first, and early disclosure should also be avoided.

With the uniqueness of their innovations safeguarded, companies can begin to monetise them and continue to develop the next generation of environmentally friendly cleaning products.

Dr Joanna Thurston is a partner and patent attorney at intellectual property firm, Withers & Rogers LLP - <https://www.withersrogers.com/>

Lancashire-based environmental consultancy Yordas Group expands to Turkey: KKDIK services in high demand

Chemical Regulatory consultancy Yordas Group has opened a new entity in Istanbul, Turkey by the name of Yordas Danışmanlık Limited Şirketi. The erection of a new office reflects the increased demand in services aimed at chemical importers and manufacturers who need help complying with new obligations under KKDIK, Turkey's new REACH-like law.

KKDIK addresses the production and use of chemical substances, and their potential impacts on both human health and the environment. In contrast with EU-REACH, following the

12-month Pre-registration period at the end of 2020, KKDIK will open a single Registration window running until the end of 2023. During this period, all substances will need to be registered.

Yordas Group can help organisations with dossier preparation and translation, provide Certified Chemical Assessment Experts to sign off the dossier and CSR, author and certify SDS and maintain tonnage and importer lists. In addition, Yordas provides Only Representative and SIEF representation services.

Further information about Yordas' services for the Turkish market can be found at <https://www.yordasgroup.com/global-notifications/turkey>

How can you better something that is already great?

Challenge:

Hosokawa Micron Ltd (HML) is a global leader in powder processing equipment used in the pharmaceutical, chemical, mineral, and food industries.

While it enjoys a competitive advantage in the marketplace, HML was inspired by a vision to go a step further and stay ahead of the game.

It was challenging for a company that has a 100-year legacy to find solutions in manufacturing that were new and digitally smart with a great 'value add' for its customers.

HML didn't have to look far for a partner to help them achieve their goal. It's relationship with Siemens is over two decades old and it uses control and measurement technology for many of its processes.

Solution:

At HML, the machine and processes are controlled through Siemens' programmable logic controllers (PLCs) and, in some cases, using supervisory control and data acquisition (SCADA) or Distributed Control System (DCS).

To enhance its processes an in-house intelligence solution was being used to extract and analyse the data, and improve performance.

HML realised that to stay competitive and make deeper inroads into industrial digitalisation, it was important to keep up with big data and analytics demands.

The solution was Siemens' cloud-based internet of things (IoT) open operating system, MindSphere, which connects the entire environment of products, plants, systems, and machines, enabling the harnessing of a wealth of data with advanced analytics.

In addition, it gives access to a growing number of apps and a dynamic development ecosystem, and works with all popular web browsers.

Siemens expertise in process engineering, process data, and its best-in-class industrial cyber security, made HML's search for a partner very simple.

Siemens has adopted the highest cyber security standards for its products and services such as the international IEC 62443 standard while also adopting other relevant standards that are used throughout its global business to demonstrate a consistent approach to security such as the ISO 2700* series of standards. It is also committed to greater cyber security having initiated the Charter of Trust in 2018 which has 17 members including Airbus, Atos, Cisco, Dell Technologies and IBM.

Ian Elsby, Head of Chemicals UK & Ireland, Siemens Digital Industries, said: "Our partnership with Hosokawa has always produced tremendous results and this is purely because we share best practice and learn from each other. We are

constantly looking for new solutions to create a better and digitally superior product for their customers.

"Industry 4.0 is constantly evolving, and so is our alliance. We are able to bring to the table the challenges from the varied verticals we work in and share the outcomes of positioning in other industries, helping Hosokawa harness that knowledge to boost their digitalisation process."

Data analysis is ubiquitous in any setting. Using Siemens' MindSphere, clients get access to maximum data extraction and powerful data analysis and visualization, giving manufacturers new insights into making changes with real productivity impact.

HML set the following key performance indicators to maximise data analysis: quality, energy usage, environmental conditions (internal and external), process parameters and the factors affecting them.

Outcome:

How has the deployment benefited HML and its customers? Simply put, it has brought about 15 per cent improvement in uptime; energy usage has been reduced by more than 10 per cent and capacity gains of between 10 to 12 per cent have been recorded for its customers.

Since the start of HML's journey of advanced digitalisation in its factory in the last three to four years, HML has grown its output significantly year-on-year, not only digitalising its own production factory but the machines it delivers to customers are of higher digital value, primed for better productivity.

With the integration of its assets across the factory in Runcorn, HML was able to upgrade its existing in-house app 'Hosokawa ReMs' to remotely monitor the performance of Hosokawa equipment and plant, including real time values and trending for key measurements, diagnostic alerts and warnings of problems detected in machinery. App users have varied options on how they want to use it, including a servitisation model from HML on providing solutions for any data anomalies that may show in the analysis.

For further information, please contact:

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Patent Drafting : Waste to Energy or Waste of Energy

On 9 July 2020, Aries Clean Energy LLC filed a patent infringement lawsuit against Eqtec PLC and its customer North Fork Community Power in the Eastern District of California asserting several US patents relating to the sustainable disposal of bio-materials and waste, particularly from industrial processes and its conversion to thermal and electrical energy for a range of uses.

Eqtec and North Fork reached agreement in January 2020 to install a biomass power plant with construction scheduled for 2021. Based on information from Eqtec's website describing its advanced gasification technology and reactor design, Aries has filed the lawsuit based on a suite of patents.

Eqtec and the other defendants have stated their intention to vigorously defend the action and have issued a public statement that claims the allegations of infringement are based on "infringement theories", (the allegedly infringing activity having yet to take place) which would "prove" the Aries patents as being invalid. Eqtec asserts that the gasification apparatus shown in the lawsuit was in fact sold and other virtually identical gasifiers were sold before the filing date of the patents, thereby making the patents invalid. Patents which claim inventions which have been made available to the public anywhere in the world before the earliest date of the patent are invalid.

This case raises important points about the development of a patent portfolio. It particularly highlights the need to integrate patent activities and strategy with business and technology strategies. With an awareness of the prior art and products/processes on the market at the time of drafting and the technology plans of the applicant, stronger more defensible patents may be secured. It is not enough however to simply have a valid patent. To justify the investment and to protect the underlying business, the patent portfolio also needs to be relevant to the commercial activity of the patent owner and would-be competitors.

But, patent applications are drafted many years before they are enforced risking a disconnection between the drafting process and shaping the assets and the enforcement process which is circumscribed by the shape of those assets. We therefore firmly believe in a "Cradle to Grave" approach in developing and utilizing a patent portfolio such that:

- patent applications are drafted with a full awareness of the complexities of litigation and enforcement;
- litigation is carried out with a clear understanding of the drafting process; and

- these activities are conducted in a strategic context through integration of technical, business and legal factors and experience.

Effective preparation of patent applications requires much more than protecting an invention. The likely nature of the infringement by a competitor, detectability, the supply chain, customer activities, the country/jurisdiction in which infringement occurs, the evidential requirements, procedural aspects, understanding the prior art and many other factors are all directly relevant as to whether the patent application will in fact turn out to be a commercially valuable patent asset in the years to come. There are therefore many pitfalls for the unwary in not adopting a "Cradle to Grave" approach:



In the Aries v Eqtec case, as the battle-lines are drawn, a key factor is that the allegation of infringement appears to be based on the same evidence as that which supports the allegation of invalidity. In arguing for an interpretation of their patents so as to encompass the Eqtec system, Aries risks having their patents read on to the prior sale of Eqtec (assuming these matters are themselves proved) and being held invalid. Eqtec in addition to claiming the patents are invalid, will need to decide whether to also argue that their system does not infringe the patents. In doing so, they may need to argue for a more limited interpretation of the patents which runs a risk of weakening the invalidity case. These pivotal issues, arising many years after the patents were drafted, are fundamentally shaped by and symbiotic with the drafting (and prosecution) of the patent applications.

Without a "Cradle to Grave" approach, the patent owner risks developing non-strategic or commercially weak patent portfolio with difficulties in enforcement. It remains to be seen whether Aries' patents provide effective protection for its waste-to-energy or whether they are a "waste of energy".

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Chemistry innovation hub NextGenChem helps Lancashire's chemical-using companies tackle innovation challenges

The NextGenChem Hub will support 300 local businesses with the development of next generation technology solutions, improved products and novel materials. Participating companies will get access to scientific workshops, expert services as well as state-of-the-art equipment and facilities.

Support is available free-of-charge for eligible Lancashire based SMEs, who use or produce chemicals. Examples of applicable sectors include chemical formulators, manufacturers and service providers as well as companies operating in the aerospace, automotive, energy, health care, life science and food and beverage industries.

By joining the NextGenChem Hub, businesses will have an opportunity to:

- Learn about the latest developments in chemistry to create efficiencies and develop new products/processes
- Access scientific expertise to help solve business challenges

- Access specialist equipment and laboratories worth over £45 million
- Collaborate on the development of innovative products, processes and services to increase competitive advantage
- Use low-risk methods for exploring new ideas whilst continuing to focus on core business

The NextGenChem team's current projects include developing catalysts with raw materials to produce basic chemicals, conducting product life cycle assessments (LCAs), developing substitution strategies to replace substances in a product with safer or more environmentally benign alternatives, and designing novel techniques to develop next generation composite materials.

Companies interested in collaborating on new innovative products, formulations and chemical processes with top-of-the-range scientists can join the **NextGenChem hub by visiting www.nextgenchemhub.org, emailing info@nextgenchem.org or calling 07815582102.**

"NextGenChem is part funded by the European Regional Development Fund and benefits from a team of leading experts in chemistry and chemical engineering from Lancaster University, and dedicated scientists and sustainability professionals at Yordas Group."

MCE Group PLC - Hydrogen Process case study using metal-seated, zero-Leakage ball valves

Industry: Downstream

Plant type: Chemical

Application: Hydrogen Isolation

Product: ValvTechnologies V1-1 Ball Valves



Success summary: Our customer had a long-standing leakage history while using "Y" pattern globe valves for isolation in hydrogen service. After re-viewing the benefits of the ValvTechnologies' zero-leakage design, the customer changed their specification to ValvTechnologies' zero-leakage, metal seated ball valves.

Challenge: Achieving tight shut off on high-pressure hydrogen (1,160 psig) service in a single direction, much less on a bi-directional valve, is very difficult for plants to realize. However, ValvTechnologies were able to custom engineer a perfect solution to not only meet but exceed the customers' requirements and expectations.

Solution: ValvTechnologies supplied V1-1 zero-leakage, A105 seat supported valves with Colmony® 69 coating on the integral seat and an Inconel® 718 ball also with Colmony® 69. The valves were tested to zero-leakage in the primary direction and class V in the reverse direction.

These were the first valves installed in high-pressure hydrogen service at this customer's plant.

Benefit: The customer will recognize repeatable, long-term, reliable tight shut off, allowing for a longer run time with significantly reduced maintenance and lower total cost-of-ownership.

Future projects: ValvTechnologies will replace the existing installed base of "Y" pattern globe valves throughout the plant with V1-1 zero-leakage ball valves.

MCE Group Plc primarily offer valve maintenance and overhaul services from our workshops based in Warrington and Stockton-on-Tees, maintaining Control, Relief and Isolation Valves including actuation.

We are also stockists of the ValvTechnologies range of zero-leakage isolation valves.



For more information, contact Selwyn Jones (Business Development Manager) on 07718 560214, or call the MCE Group Plc offices on Warrington 01925 202399 or Stockton-on-Tees 01642 8822

How innovative leadership is helping a chemical manufacturer take on its toughest test

A chemical manufacturer, supported by Made Smarter, has embraced a new approach to leadership during the coronavirus crisis.

Forced to close or reduce operations in factories and offices, owners and senior managers involved in the North West digital technology adoption pilot faced their toughest test as they figured out how to restart, reassure their uncertain workforce and customers, and recover.

Now a business leader from Actikem, based in Warrington, has revealed that changing their approach to the new needs of their workforce and business is helping them navigate the impact of the pandemic.

Agile leadership, flexibility, transparency, open communications and being receptive to learning from others have proved vital new tools for the future.

Andrew Mooney, Managing Director of Actikem, said transparency through regular and open communications was a critical factor.



“We focused on getting the communication right across the business, keeping in regular contact when employees work from home, so they do not feel isolated,” he said. “We have been very open with personnel about COVID-19 impacts on the business and they have appreciated that.”

Mooney is part of the second cohort on the Made Smarter Leadership Programme, which had to switch online with virtual tutorials to give leaders a strategic view to support the adoption of hi-tech and digitally-based manufacturing techniques into their own production processes.

“COVID-19 has also made me think more about what our strategy should be as we come out of this pandemic,” he said. “It has cemented my thoughts of moving our IT infrastructure to a completely cloud based solution. The benefits of home working deliver improvements in productivity, better utilisation of office space and value improvements to staff in time and money in the pocket. It also gives us challenges about hardware at home, IT security, mental health and communication and collaboration.”

Donna Edwards, Made Smarter programme director, said: “From the start of the pandemic Made Smarter has been in regular contact with leaders across the region offering support and advice. Our conversations revealed some striking

changes in the traditional norms, attitudes and behaviours that guide leaders.

“They have demonstrated agility and adapted to an unprecedented and emerging situation to ensure people and plants have remained functional. New flexible approaches have helped individuals and teams cope with the intense challenges to their daily and working lives. In many cases they have used the pain to change longstanding practices and find better ways of doing things. At the heart of this need for change is technology, which has proved invaluable in allowing manufacturers to work remotely to maintain operations and communications and prompted SMEs to accelerate and broaden their adoption of digital tools.”

It isn't just SME leaders who have experienced lightbulb moments during the pandemic.

Glyn Jones, chair of Made Smarter's North West adoption steering group and BAE Systems' delivery director for the Tempest programme, said Covid-19 challenged long-standing paradigms in his business.

He said: “Covid brought a huge amount of focus, energy and some amazing innovation to get the business back on its feet.

“Things we previously thought impossible were achieved in the space of weeks and whilst it was challenging both personally and professionally for a lot of people, we saw some amazing things happen.

“In the past 25 years I have led many different teams and I have never experienced anything like this, but it is often at times of great adversity that people's leadership skills come to the fore. I am sure many of us have seen that in the past few months.

“There is no leadership book on how we deal with a situation like this, so being open to learning from each other adjusting our approach is vital.

“We will continue to face challenges for a long while yet, but we must find a way to harness some of positive changes, embrace this new attitude and new ways of working rather than simply going back to the way things used to be.”

Registration for the next Leadership Programme starting in October is now open.

For more information or to apply for your place visit www.lancaster.ac.uk/lums/madesmarter or alternatively: email madesmarter@lancaster.ac.uk or call 01524 593 881



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Using mobile devices whilst driving

The recent conviction in March 2020 of an HGV driver for causing death by dangerous driving is one of the latest in a long line of Road Traffic Collisions (RTC) involving the use of a mobile device whilst driving.

This latest case is particularly shocking (caused in part by video footage) as it shows the driver's first action when getting out of the cab was not to rush to see how the cyclist he'd just hit was but to put his mobile phone in an external compartment where it should have been all along. It also indicates how the message about not using mobile devices whilst driving still needs further reinforcement.

Employers might point to the criminal penalties relating to the use of mobile phones being enough of a deterrent. However, research¹ in the United States points to texting and driving being behind 25% of all accidents, and a 2018 UK survey² indicated that 18-24 year olds are likely to use their smartphone to check social media when driving almost as much as when waiting in traffic, it's clearly a problem that continues to grow.

The addictive nature of social media means that for many, hours alone in a company vehicle offers opportunity to feed that addiction. OFCOM's 2018 research³ indicates that people in the UK were now checking their smartphone every 12 minutes, and the increase of familiarity with this connectivity could lead to even more smartphones being use whilst driving.

Educating employees on the importance of managing the need to stay connected is going to be a challenge – especially with the current UK-wide lockdown meaning that some people are often relying on social media to keep in touch with friends and family, but with the level of distraction caused by using a mobile device whilst driving being so potentially dangerous, doing nothing is not an option.

So what can employers do?

Having a policy on the use of hand-held mobile devices is obviously a start, but given the addictive nature of social media, relying on individuals to completely disconnect from their online world for the duration of a 4 hour work-related journey is probably unrealistic, and some companies are beginning to schedule in more regular breaks for HGV drivers e.g. a 15 minute break every 2 hours either side of a lunch break.

Technology (in the form of multiple cameras, including in-cab units) can help remind drivers of their obligations to focus on the road rather than social media, and employers can monitor the use of company devices (and review data records as part of a post incident investigation).

What about employees personal devices?

Some companies insist they are turned off whilst driving, whilst others insist, they are kept back at the business until the driver returns.

In the event of a serious RTC, it's likely that all devices will be impounded at the scene by the authorities, but what about those minor incidents where there is no Police or HSE involvement?

One possible option could see employment contracts giving employers the authority to access personal phone data records in the event of any RTC whilst driving for the business. Although there would appear to be reasonable grounds to pursue this for some, you should always seek appropriate expert input from suitably qualified and experienced advisors before embarking on such a path.

Whatever you do, it's important that you balance the needs of your business with the needs and rights of employees alongside the protection of both your own drivers and the world around them.

1 <https://www.edgarsnyder.com/car-accident/cause-of-accident/cell-phone/cell-phone-statistics.html>

2 <https://press.gocompare.com/news/58-percent-of-young-drivers-using-mobile-phones-behind-the-wheel>

3 <https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/decade-of-digital-dependency>

**For further details please contact Karl Jones,
OAMPS - www.oamps.co.uk**



A health technology milestone amid a global pandemic: reflections on the first year of the HealthTec Cluster

“When the HealthTec Cluster launched a year ago, nobody could have predicted that it would reach its first milestone in the midst of a health crisis,” commented Phil Carvil (HealthTec Cluster Development Manager, Science and Technology Facilities Council) on the week that marked the first ‘anniversary’ of the HealthTec Cluster, hosted at Sci-Tech Daresbury.



A space physiologist by background (as well as a trained Barista!), Phil has led the development of the HealthTec Cluster since its inception. Driven by his strong belief in collaboration and, of course coffee, the cluster has the vision of supporting cutting-edge R&D, commercialisation and the growth of solutions that can empower citizen health and wellbeing.

“Throughout the last year businesses involved with the cluster have achieved incredible things in an effort to address our health system challenges; from building our next generation of cancer therapy, to testing kits for COVID-19, they are delivering solutions that will drastically improve people’s lives,” remarked Phil.

Welcome to the coffee shop

Whilst hosted at Sci-Tech Daresbury, the HealthTec Cluster works to drive collaboration and connectivity across the North West and beyond. Over the last year the cluster has supported more than five trade missions to the North West, built a connected community through the bimonthly ‘HealthTec Huddle’ events, and worked to build cross-sector relationships both regionally and nationally. This influence is clear to see, with more than 40 health and life science organisations now based at Sci-Tech Daresbury, equating to a 15% growth in the sector on campus this year.

So what is the cluster? As a former Barista there’s clearly no better way to explain than through a coffee shop analogy, “The innovation landscape is so rich and diverse for me, it’s

like going to a coffee shop. When you walk in you have so many options on that board. You likely have an idea of what you are looking for, it could be access to finance, it might be understanding more about a technology or process, a critical friend to sound an idea off, or a route into an organisation. The cluster acts like that reliable shop with a board of different opportunities. Importantly, as what you’re looking for develops and changes over time, the cluster community allows you to connect, share and develop these insights. The ‘over time’ part is important because whilst you could try all those options in a single visit, you’d likely need a lie down after.”

These connections allow companies and organisations to operate more flexibly and productively; accessing new technology, information or skills, which would otherwise need to be developed independently.

Reacting to coronavirus

Government commitments of support for the development of health solutions continues to grow, and the wide ranging impact of the sector has been explicitly highlighted in the UK response to coronavirus. From the accelerated adoption of remote consultation through telemedicine, to developing novel testing techniques, the importance of health and life sciences innovation in addressing health challenges has been unequivocal during the pandemic.

“These past few months have been tough, for some it has meant a complete rethink of the business model and operation, for others a pivot on their research and innovation endeavours and for many all hands on deck. Throughout though it has been astounding to hear how the sector has been responding and there has been some incredible achievements,” Phil commented.

Looking ahead

This breadth of work throughout the community acts as an effective illustration of the strength and benefits of regional and national connectivity in enabling innovation and rapid response to health challenges. The next year will continue to see focus placed on maximising these connections, aiding recovery, sharing learning and boosting innovation.

To borrow a quote from Einstein “We can’t solve problems by using the same kind of thinking we used when we created them”. There is no doubt that this period will have altered our way of thinking, and the cluster is a great way to enable that conversation, of course, over a coffee,” Phil finished.

To find out more about the HealthTec Cluster visit:
www.stfc.ukri.org/innovation/healthtec-cluster

VUCA World: Can this acronym help us now?

Volatility. Uncertainty. Complexity. Ambiguity. On the surface, these words certainly speak to our current situation in the UK. In fact you might even be trying to remember a time when VUCA didn't apply.

VUCA – Where does it come from?

The VUCA concept has military origins, first introduced in the early 90s in the US to describe the situation after the Cold War. It took off in a business context after the 2008 global financial crisis and roughly translates into “it's absolutely crazy out there!”

It's all about the future – the various dimensions of 'uncontrollable' we find ourselves in and how we might best deal with it. And right now we think it's more important than ever to consider how we can support young people to successfully navigate a VUCA world.

VUCA – What does it really mean?

The four elements of VUCA are related, but they present distinct elements that make our environment – world, life, work or study – harder to control.

Volatility is about speed of change. It is associated with fluctuations in demand, turbulence and short-time to markets. In short, high volatility means rapid change.

Uncertainty refers to the extent to which we can predict the future. With high volatility, it's much harder to predict events and trends.

Complexity relates to the number of factors we must take into account, their variety and the relationship between them. The more factors, variety and interconnections, the more complex the environment becomes and the harder it is to analyse and understand a given situation.

Ambiguity is the lack of clarity in interpreting something. It is vagueness in ideas and technology. Because of complexity and uncertainty, it is often difficult to discern what is contradictory or inaccurate.

Are young people facing a VUCA world?

COVID-19 has made this question seem like a no brainer. But there were and are other issues that will continue to face young people in the future...

Society is undergoing far reaching changes and young people's social worlds are becoming increasingly complex.

Their career trajectories are increasingly volatile, mostly due to the introduction and advancement of technology.

And that's if they can secure employment in the first place. Lack of opportunities, low pay and getting work experience adds to the uncertainty and instability of their situation.

Can we help young people survive, or even thrive in a VUCA world?

At Outward Bound, we're pretty sold on this one. Here are some fundamental skills we think will help young people to negotiate their futures.

1. Develop CQ. That's your change quotient. It is becoming critically important to be able to deal with constant change, and not be overwhelmed. Having a structured approach and mental strategy for dealing with unexpected change and challenge will help young people navigate this rollercoaster. CQ is closely linked to a little characteristic we like to call resilience.
2. Plan, plan, and plan again. Amidst the murky waters of unpredictability, it's important to be able to focus on priorities and set goals to get there. We advocated adaptability and flexibility through CQ, but combining this with the ability to plan will better help young people to reach their personal ambitions. Developing planning, adapting and goal-setting skills is closely linked to self-regulation abilities – which refers to the control of emotion and behaviours, and is another key factor in resilience.
3. Focus on soft skills. Have soft skills ever been more important than in this aftermath of social isolation, forced adaptation to sudden and immediate change and managing unknown timescales? Our world changes rapidly, but having strong communication and team-work skills, a positive work ethic and focused mindset will never go out of fashion.

The volatility, uncertainty, complexity and ambiguity we're living in presents a genuine challenge for young people. To help them deal with these challenges, we think it's essential that young people are supported in the development of key soft skills – to help them be adaptable, focused, and collaborative in this VUCA world.



John McCarthy,
Client Relationship -
<https://www.outwardbound.org.uk/>

Michael Smith Engineers Ltd

Michael Smith Engineers Ltd was formed in 1971 as a specialist pump distributor. We have our head office in Woking and a satellite office in Wetherby, allowing us to provide service and support to customers throughout the United Kingdom.

Our workshops are fully equipped for assembly, repair and testing of our pump ranges and we also offer on-site consultancy, trouble-shooting, commissioning and service. With an average length of service of over 15 years, we can call on broad experience to solve difficult pumping problems. We have been accredited to ISO 9001 by NQA Ltd since 1994.

The main markets we service with our ranges of pumps are the chemical, petrochemical, pharmaceutical and process sectors with our larger pumps as well as laboratories, research and development institutions and OEMs with our smaller pumps. We only promote products for which we have been appointed as distributors and

currently hold an extensive stock of pumps and parts.

Our range includes gear pumps, centrifugal pumps, diaphragm pumps and piston pumps, many of which can be supplied in leak-free sealless designs. Corrosion resistant materials are available for many of our products including metallic options of stainless steel and high nickel alloys or plastic options of PVC, polypropylene, PVDF and ETFE.

We can supply pumps for liquids between 0.2 cP and 500,000 cP, temperatures between -50°C and +400°C, capacities from nanolitres per hour to over 15m³ per minute and for discharge pressures up to 500 bar.

Michael Smith Engineers have experience of pumping many hard to handle liquids including acids, bases, organic liquids, solvents, inorganic liquids, slurries, volatile liquids, corrosives, abrasive liquids, non-lubricating liquids, liquids with entrained gases and flammable liquids.



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Innovative sealing technology enhances pump performance

New developments of an innovative sealing technology have been added to the range of Viking Universal Seal Series of Internal Gear Pumps. The result is a more cost-effective sealing option compared to traditional mechanical seals whilst also reducing leakage rates compared to using pumps with packing. The new option is also designed for back pull-out which helps to reduce downtime and simplify maintenance.

Available from the UK's leading pump specialist Michael Smith Engineers the new O-Pro seal uses a series of O-rings to create a robust seal and lubrication chamber in a single piece seal. This new feature can be fitted throughout the Viking Universal Seal Series pumps which cover flows to 295 m³/hr, discharge pressures to 14 bar and liquid viscosities between 20 - 1700 cSt at temperatures between -15°C to +175°C.

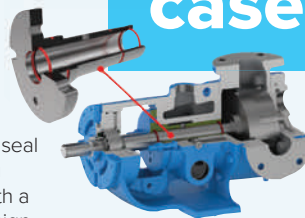
Originally designed for use on Viking Universal Seal pumps on sugar and confectionery process applications, this latest version can be retro-fitted to the majority of the Universal Seal packed pumps without the need for modifications. This means there is now an option for a wider range of applications such as pumping isocyanate, paints, adhesives and inks as the barrier fluid stops air bound moisture contacting the pumped fluid.

This new sealing technology is available in three options. Firstly, the O-Pro Barrier seal which replaces both bushing and sealing elements, packing or mechanical seal with a machined seal gland. This innovative design combines a bracket bushing and seal gland made of hardened cast iron with two sets of double O ring seals for reliable sealing and easy maintenance. The pair of static O-rings seal externally on the bracket and the pair of dynamic O-rings seal internally on the shaft preventing process fluid from leaking out of the pump and reducing wear between the shaft and the bushing. The area between each set of inner and outer O-rings is filled with lubricating liquid, providing lubrication whilst also acting as a double seal barrier fluid to prevent leakage along the shaft.

The O-Pro Barrier Seal can be used on any of the metallurgies available across the Viking Pump range to replace either mechanical seals or packing as long as the process fluid is compatible with hardened cast iron. It has a bushing clearance at the inboard end and wider clearance as you move outwards to allow for the barrier fluid to lubricate and cool the bush and O-rings.

The second and third options are the O-Pro Guard and O-Pro Cartridge which are suitable

case study



for replacing mechanical seals and packing in applications where a hardened cast iron bushing isn't suitable.

Available in stainless steel, these options replace both packing, or a mechanical seal by using a series of O-rings to seal between the bracket and shaft surfaces giving a compact design for easy retrofit and simple ongoing future maintenance. Like the O-Pro Barrier seal, these form a chamber between the O-rings which is filled with clean lubricating fluid creating a barrier fluid system which prevents leakage of the process fluid along the shaft.

With the O-Pro Cartridge the dynamic O-rings runs directly onto the pump shaft and so are best used on pumps with a hardened shaft, while the O-Pro Guard incorporates a hardened sleeve which is fixed to the shaft and so can be used on any shaft material. Both of these options are made in stainless steel and can be used with any of the Viking Universal Seal metallurgies as a direct replacement for mechanical seals or packing. However, unlike the O-Pro Barrier Seal, they do not replace the pump bushing.

More details at: <https://www.michael-smith-engineers.co.uk/resources/useful-info/viking-pump-o-pro-seal-technology>
Email: Info@michael-smith-engineers.co.uk

Supplying to the Chemical Industry

Knowing your local supply chains is important, and suppliers of expertise, solutions and great products are right here in the northwest. CNW members have a strong association with and many years of experience supplying to the chemical industry. The companies listed in this directory cover a wide range of products and services. They have established customers in the sector, with proven track records. Many will be well known, long-standing firms and there will also be new and innovative businesses that you may not have heard about. Effective supply partnerships, delivering success for all! For more details, the websites for the listed companies and organisations can be found at:

<https://www.cia.org.uk/chemicalsnorthwest/Membership/Our-Members/>

Distribution, logistics & chemical handling

2M Holdings Ltd

Chemical distribution and related services of sample management, storage and blending. Provision of AdBlue, Samsol products, packed chlorine and TRIKLONE & PERKLONE chlorinated solvents. Markets served include: automotive, precision cleaning, coating, oilfield & refineries, flavours, fragrances, surfactants for personal care, household and industrial cleaning and pharmaceuticals.

Actikem Ltd

An ISO9001 certified business, specialising in a range of chemical processes and manufacturing services, including mixing, storage and re-packaging. We provide toll and custom manufacturing services for SMEs as well as blue-chip organisations, and supply customers with on-tap production facilities, offering them potential cost-savings and greater flexibility.

Brenntag UK & Ireland

Connects chemical manufacturers and chemical users in a value-adding partnership through tailor-made distribution solutions. Offers specific application technology, extensive technical support and value-added services (i.e. just-in-time delivery, product mixing, formulation, repackaging, inventory management and drum return handling). High safety standards and strives to make served industries sustainable.

F2 Chemicals Ltd

As a specialist in the handling of fluorine gas, F2 Chemicals Ltd offers a variety of organofluorine products all manufactured at our Preston plant. Our primary product is a range of high specification perfluorocarbons, such as octafluoropropane and perfluorodecalin, under the Flutec tradename, used in applications including medical, tracers, plasma-cleaning, cooling and cosmetics.

Hosokawa Micron Ltd

Integrated powder processing technologies including: size reduction, air classification, mixing, drying, containment equipment such as gloveboxes and downflow booths. Contract processing services for 1kg to multi-tonne lots. Remote monitoring solutions that include: condition monitoring, analytics for improving product quality and energy efficiency and on-line diagnostics for predictive maintenance and improved plant availability..

Kanon Liquid Handling Ltd

Design and manufacture of drum, IBC and container filling systems ranging from fully automated robotic systems to simple manual machines. Full range of marine, road and rail tanker loading/unloading and safe access equipment. Distributor for Mann-Tek couplings, with repair facility and 'return to base' option.

Education, training & skills

All About STEM

Lots of different projects to bring exciting Science, Technology, Engineering and Mathematics to schools across the region, linking them with business and industry expert volunteers inspiring the next generation of STEM specialists. Building and maintaining relationships with our schools, businesses, industry, colleges and universities so that we can strategically match-make opportunities with need.

Catalyst Science Discovery Centre

An independent charitable trust playing a pivotal role in promoting science across the Northwest. Catalyst works in conjunction with industry partners to excite young people about all STEM subjects and careers available within the science sector. Companies can also sponsor a local school to visit and attend industry days.

Centre for Industry Education Collaboration

CIEC supports companies in making credible and sustainable links with primary schools, in order to inspire the next generation of scientists and engineers. We train STEM professionals to improve their communication skills, and develop industry-focused activities for use directly by teachers or by ambassadors visiting schools.

Chemistry with Cabbage

We work with students of all ages, demonstrating through practical experiments, the relevance of chemistry in solving problems. Research shows that children make career choices very early on, so capturing their imagination early is important. Chemical companies are welcome to support our hands-on work in primary schools.

EngineeringUK

Not-for-profit organisation promoting the contribution made by engineers to society. We partner business and industry, government and the wider science & engineering community, producing evidence of the state of engineering. Sharing of knowledge and inspiring young people to choose a career in engineering.

Manchester Metropolitan University

Degree apprenticeships, consultation services, collaborative and contract research facilities, and students seeking placement opportunities. The Department of Natural Sciences trains undergraduate and postgraduate students in chemistry, pharmaceutical chemistry, medicinal and biological chemistry, biology and environmental science. New MSc in Advanced Materials starting in September 2020 <https://www2.mmu.ac.uk/natural-sciences>.

SEERIH

The Science & Engineering Education Research and Innovation Hub positively influences the experience of young people in science and engineering. Expertise in curriculum and teacher development, applied research and creation of innovative projects related to primary science and associated STEM disciplines. Inspiring excellence in teaching and learning in science education.

The Outward Bound Trust

An educational charity that uses the outdoors to help develop young people. Experts in the development of early talent and specialising in providing experiential learning and development programmes for apprentices and graduates. Identification, development and change of people behaviours in line with organisational needs.

TTE Training Ltd

Engineering training and apprenticeships focused on whole person development and bridging the sector's skills gap. The learning environment will be one which is welcoming, safe and inspiring, appropriate to the subjects and responsive to the needs of the learner.

University of Chester

Faculty of Science & Engineering offers new degrees in chemical engineering, electronic & electrical engineering, mechanical engineering, natural sciences alongside established degrees in mathematics and computer science. Close links to local chemical companies with student placements and collaborative research projects.

Wirral Met College

Provision of education and training, supporting innovation and development. The College is pioneering SIP traineeship programmes with local employers, preparing young people for science apprenticeships. New STEM Centre opened in 2016.

Engineering products & services

DHD Cooling Limited

Design, installation and maintenance solutions for industrial cooling. Our service extends to cooling system inspection, testing, service, maintenance and new equipment capability. Regulatory and reliability assessments, thermal performance improvements, turnkey projects and carbon footprint reduction.

HTS Engineering Group Ltd

Process safety and safety instrumented systems, delivered with a high level of engineering and expertise with cost efficiency. Four key engineering services that can be tailored individually or as one complete solution: process control & software engineering, engineering & design, site installation and inspection services.

Laker Vent Engineering Ltd

Supply, fabrication and installation of process and utility piping systems. Project management, detailing, procurement, on and off-site fabrication and installation of pipework and coded welding. Associated steelwork supporting and mechanical installation of plant and equipment. Testing and Handover. Pipework and steelwork is fabricated to specific customer-needs and conforms to all appropriate ISO, BS EN and ASME standards and specifications.

Know your supply chains

Lokring Northern (UK)

Special mechanical fitting system that produces a permanent weld equivalent pipe connection, eliminating the need for hot work, NDT and associated health and safety issues. Lokring fittings are code qualified to ASME B31.1, B31.3 and other industry standards. A proven cost saver compared to traditional welding and fabrication methods.

Manntek AB

Supply of safety dry disconnect and safety breakaway couplings. Comprehensive range of specialist dry quick release couplings to suit 99% of known chemical applications. Bespoke solutions with a size range of ¾" to 8" nb. Dry disconnect couplings are made to NATO standard Stanag 3756.

MCE Group

Offering valve service and overhaul in our state-of-the-art service workshops, or on site, using OEM parts, from single valves to complete outages.

European distributor for ValvTechnologies, providing severe service, zero-leakage isolation valve solutions, setting the standard for the next generation of valves for the chemical industry.

Michael Smith Engineers Ltd

Have been supplying pumps to the UK Chemical industry since 1971. We specialise in sealless pumps and our product range includes gear pumps, centrifugal pumps, high pressure pumps, piston pumps, side-channel pumps, vane pumps, AODD pumps and barrel emptying pumps with thermoplastic, metal or PTFE-lined wetted parts.

Perry Process Equipment Ltd

Buying and selling of high quality used processing plant and equipment. Savings of up to 70% on the cost of process equipment, full mechanical and electrical refurbishment and equipment immediately available from stock. Centrifuges, dryers, evaporators, filters, heat exchangers, mills, mixers, reactors, separators, tanks.

Studley Engineering Ltd

A multi-disciplined mechanical and electrical engineering contractor, providing a comprehensive service to the process industries in disciplines including: steelwork, welding, maintenance, site services, pipework, tanks and vessels. Over time we have gained an enviable reputation as a reliable, responsive, motivated contractor that delivers safe, high quality, cost effective work.

Swagelok Manchester

Fluid system solutions, products, training and services. Supply of over 7000 fluid system components including: fittings, hoses, tubing, regulators, equipment servicing and custom fabricated solutions. Provision of practical information, know-how, tools and speciality services needed to purchase, manage and apply them successfully.

Yokogawa

Yokogawa is a leading provider of field instrumentation, safety systems, industrial automation and digital transformation solutions.

I/OT, OT Cybersecurity and Alarm Management are specific areas of focus for Yokogawa's Advanced Solutions team with a number of major projects currently being delivered across Europe.

Engineering project management & energy

6 Engineering

Is a safety engineering consultancy for the major hazard industries specialising in process and functional safety. Our mission is to provide world class safety expertise, helping you to keep people and assets free from unnecessary risk. Our site engineers can be there to support you when you need us. See more at www.6engineering.co.uk

Axiom Engineering Associates Ltd

An award-winning company specialising in the provision of UKAS accredited inspection services, backed up by a mechanical and materials asset integrity section. Acting as the design and inspection authority to many blue-chip companies, working across a broad range of process sectors such as: chemicals, petrochemicals, bulk storage, power and pharmaceuticals.

Clarke Energy

Specialists in the engineering, installation and maintenance of reciprocating engine-based Combined Heat & Power (CHP) plants. Offering ranges from supply of an engine through to turn-key installation of a multi-engine power plant. Our facilities deliver fuel efficiency, dramatically lower energy costs and help reduce carbon emissions. Carbon dioxide can also be recovered.

Graham Hart (Process Technology) Ltd

Delivering high integrity heat transfer equipment for over 45 years. The company has a strong emphasis on Chemical/Process & Mechanical Engineering backed up by an advanced manufacturing facility.

Otto Simon Ltd

Diverse engineering consultancy and project delivery organisation. Initial consultations, technical and commercial due diligence and front-end design and definition. Feasibility studies through design, supply, erection, and commissioning services using in-house and licensed technology. Services for complete plants or upgrades. Procurement, construction management, start-up and operation & maintenance expertise.

PM PROJEN

A multi-disciplined engineering, design and project management business working across a range of market sectors for a diverse mix of clients from SMEs to multinational blue-chip companies. We are part of PM Group, a 2,200 strong, employee owned company operating across Europe, Asia and the USA.

Worley Resources & Energy

A professional services company delivering, concept, prefeasibility and feasibility studies, FEED and Detail Engineering, Procurement and Construction. We also offer a wide range of advisory services. We support the chemicals, hydrocarbons, infrastructure and minerals & metals sectors over their full lifecycle, providing end to end services.

Engineering, IT & process consultants

BPE Design and Support Ltd

Progressive and innovative process engineering consultancy. Extensive process development and scale-up experience and process modelling and simulation is a core expertise. Early stage concept and feasibility studies as well as subsequent design, commissioning and qualification stages. Independent HAZOP chairing, ATEX/DSEAR assessments and SIL/LOPA studies.

EJ Peak Technology Solutions

Process control, industrial automation systems and manufacturing analytics. A unique combination of automation projects, consultancy, and performance improvement services delivered by experienced teams. FEED, process control projects, legacy asset replacements, control room and operational technology, modern manufacturing analytics solutions.

Gexcon UK Ltd

Safety and risk management and advanced dispersion, explosion and fire modelling. Unique expertise and shared knowledge on how to prevent explosion accidents. Carrying out accident investigations and dedicated facilities for physical testing. Ventilation and dispersion modelling also available. Hazardous area classification and quantitative and qualitative risk analysis and assessment.

HFL Consulting Ltd

A unique blend of leadership, management, consulting, engineering and training services is offered to the chemicals industry. A forerunner in sustainable process safety management combined with proven business improvement capabilities enables delivery of practical solutions to promote safety and efficiency in design, operation and maintenance of complex hazardous facilities.

Intersolia

Intersolia provides large organisations and small firms with a web-based platform designed to enable them to achieve COSHH compliance, and most importantly providing those who use chemicals as part of their everyday workplace activities with the critical safety information needed to safeguard their health and in doing so, protecting the business.

Siemens Digital Factory & Process Industries and Drives

Productivity and efficiency requirements continuously increase in the field of process automation. A comprehensive range of process automation and Drives products as well as an award-winning range of training and support services.

Environment, health & safety risk management

ABS Consulting

A global process safety consultancy and training services provider with regional headquarters in Warrington, UK. Our expertise in data-driven risk and reliability includes a range of capabilities: root cause analysis, incident investigation, organisational culture evaluation, risk management, process hazard analysis, bow-tie and data science techniques. Our approved process safety leadership training courses and proficiencies also include building risk assessments, HAZOP analysis, compliance auditing, asset integrity management competency assurance and management systems certification services.

BakerRisk Europe Ltd

Dedicated to help predict, prevent and mitigate hazards and explosions, fires and toxic releases. Specialising in process safety and risk management, we help clients understand their risks and offer cost-effective risk management solutions. Success is delivered through proven knowledge and experience, innovative research and unique engineering capabilities.

Chemical and Industrial Consultants Association

An association of independent consultants with extensive experience, many having worked in the chemical industry, across various fields. Provision of technical and business advice on almost every aspect of chemical manufacture, development, marketing and management.

RAS Ltd

Expertise that covers the full range of risk assessment and management services across: safety risk, business risk and environmental risk. Carry out Quantitative risk Assessments and Predictive & consequence modelling, through 'softer' risks affecting an organisation's reputation.

RPS Group

Provision of specialist consultancy to help those with responsibility for health and safety achieve compliance. With particular expertise in the chemicals sector, we provide support from plant development through to operation. Core services include: ATEX/DSEAR, asbestos, BowTie analysis, CDM, COMAH support, fire safety engineering, functional safety, hazard identification, Legionella, occupation health and risk assessment/analysis.

Facilities, finance and other business services

ChemQuest Ltd

Sourcing and procurement solutions for research and development. Expertise in biochemical, chemical, nanotechnology, cell cultures, equipment, consumables and sundries. Streamlining and simplification of importing and purchasing processes.

Department for International Trade – Northwest

Operational support for British exports as well as facilitating inward and outward investment activity. Support is given to first-time exporters or established exporters requiring more help with accessing more difficult markets or putting strategic alliances in place. Access to expert advice, trade services, training and events.

Falck Fire Services UK

A leading, global and dedicated emergency services provider and fire-fighting specialist to high risk industries. Tailored outsourcing contracts and a high quality integrated fire protection system. Incident fire training courses for emergency response teams, including practical scenarios. Consulting services specialising in fire and explosion hazard management

Grant Thornton UK LLP

One of the world's leading organisations of independent advisory, tax and audit firms. We help dynamic organisations unlock their potential for growth by providing meaningful, forward looking advice. Provision of assurance, tax and advisory services. A dedicated Innovation practice that has an enviable track record of working with successful and dynamic companies to realise their ambitions for growth.

Halton Borough Council

World renowned research facilities such as Sci-Tech Daresbury and The Heath alongside many companies at the cutting edge of science, technology and advanced manufacturing. We oversee capacity in terms of land, buildings, people and business support creating a world class location.

Pen Underwriting incorporating OAMPS

Specialist Insurance services to high hazard manufacturing and haulage industries. Motor fleets, property, liability and transit policies. We help clients minimise risk through proactive risk management and a range of training and response services to assist companies in planning for and dealing with incidents and emergencies.

Sci-Tech Daresbury

We are a national science and innovation campus, and enterprise zone providing a range of office, laboratory and workshop accommodation for technology companies (from a desk to large laboratory and office units). Companies have access to a range of facilities covering material analysis, virtual design & simulation, and rapid prototyping.

STFC Innovations Technology Access Centre

A unique, fully equipped space for innovation, research and development. Providing flexible access to laboratory space, "hot labs" and scientific equipment. Ideally suited to start-up companies, smaller and medium size enterprises and R&D team from established companies.

TW Languages Ltd

Provision of a professional and reliable multi-lingual translation service delivering high quality translations. We specialise in business, technical and scientific translations into 250+ language combinations. We provide certified translations for legal purposes. We are full members of the ATC & EUATC and ISO 17100 Translation Services certified.

Laboratory products testing and services

Chilworth Technology Ltd

Process safety testing services aimed at helping companies avoid major incidents such as fire, explosion or loss of containment. Combining process safety engineering and management expertise with the use of test data allows us to help clients achieve the most effective and practical approaches to safe and efficient processes.

Labtex Ltd

Suppliers of leading laboratory products and process scale-up equipment. The list includes: HUBER liquid temperature control systems, DIEHM glass reactors to 100 l, PREMEX and AMAR high pressure autoclaves, POPE wiped film or short path evaporation and distillation, Nutsche filter dryers and many more.

XCellR8 Ltd

A world leader in animal-free testing. Our GLP accredited laboratory provides ground-breaking in vitro safety tests for the chemical and personal care industries. We are passionate about delivering testing strategies that are both scientifically advanced and ethically sound. Our award-winning work is recognised at a regulatory level by the OECD and ECHA.

Legal & patents

Appleyard Lees LLP

Patent and trademark attorneys. Aim to obtain the best possible patent protection for clients. Experience of product clearance against competitor patents and in due diligence for mergers and acquisitions. Advice on licensing issues and collaboration agreements relating to IP.

Bawden and Associates

A legal firm providing professional services across all IP matters. Drafting and prosecution of patent applications, handling opposition and appeals in the EPO and in litigation in UK and international courts. Business led and strategic approach to generate assets of real commercial value..

Marks & Clerk LLP

Intellectual property services, advising start-ups, SMEs and multi-nationals with large global IP portfolios. Comprehensive range of IP services covering patents, trademarks, designs and copyright. Obtaining protection worldwide, portfolio management, strategic and commercial advice, licensing, enforcement, due diligence, valuations and litigation.

RW Legal Ltd

Provision of pragmatic legal advice to companies in the chemical sector. Particular expertise in drafting and negotiating commercial contracts. Managing legal risk through early involvement to save time and resources in the long run. Competitive rates and flexible fees without sacrificing quality.

Squire Patton Boggs (UK) LLP

Global legal company providing legal, regulatory and advocacy assistance to the chemical and performance material industries. Expertise that emphasises areas that mean the most to industry such as environmental, mergers and acquisitions, commercial finance, construction, litigation, IP, public policy and international expansion.

Symmetry Law

Specialist law practice structured to provide "partner" level experts at "junior" level prices, with a focus on the 'high consequence' end of the spectrum. Legal services include: environmental, safety, regulatory, contracts, tax, construction, green incentives, litigation.

Withers & Rogers LLP

A leading UK and European intellectual property law firm with five offices including London and Munich. We offer a range of IP services including obtaining UK, European and worldwide patent or trade mark protection, the handling of contentious matters, advice surrounding licensing arrangements and issues including validity of patents and "freedom to operate".

Know your supply chains

Legal and Patents Continued...

WP Thompson

Intellectual property attorneys providing high quality advice to start-ups, SMEs or FTSE 100 companies. Team of experienced IP attorneys specializing in chemistry and life sciences, with first degrees and PhDs in these fields. Securing the most appropriate, cost effective and commercially valuable protection for your intellectual investment and innovation.

REACH and chemicals services

Dr Knoell Consult Ltd

An independent service provider for the chemical and related industries. Globally the Knoell group has over 450 employees covering all aspects of regulatory compliance for industrial chemicals, agrochemicals and biocides: e.g., strategic planning, dossier preparation, exposure assessment, SDS preparation, and from REACH to K-REACH!

GlobalMSDS

A complete safety data sheet/literature and regulatory service for your entire product communications in any language, style and format required. Hazmix is a new 'pay as you go' web-browser product that is setting a new standard in SDS authoring. A Solutions service that also provides technical advice.

Intertek Regulatory Services

Health, environmental and regulatory services for implementation of chemicals management. Worldwide registration of chemicals, food contact compliance and notification, global chemicals compliance, design/optimisation of toxicological and eco-toxicological studies, hazardous substance management, EU cosmetic and biocidal products compliance, classification & labelling, SDS consulting.

Stewardship Solutions Ltd

Provision of chemicals regulatory services to organisations across many industry sectors and throughout the world. REACH and CLP compliance is a primary focus, and REACH registrations programmes are a core strength. The company has achieved significant savings in the costs of REACH compliance on behalf of many of its SME clients. Stewardship Solutions is a REACHReady-approved service provider.

Yordas Group

Yordas Group is a leading provider of scientific, environmental, human health and global regulatory consulting services. They offer chemical regulatory support, expert scientific services and support on chemicals management and product stewardship, global hazard communication, hazard and risk assessment, analytical and (eco)tox testing.

Recruitment

Adepto Technical Recruitment

A specialist engineering, manufacturing and scientific recruitment consultancy that focuses upon the provision of permanent staff and contract resource to the Chemicals industry. Established in 2015, Adepto has quickly become the partner of choice for many blue-chip and SME manufacturers, engineering companies and consultancies due to our deep knowledge of the industry, credibility and professionalism.

Millbank

With over 30 years' experience providing recruitment solutions to major clients in the chemical sector, Millbank has an extensive database of experienced candidates and contractors ready to join projects across the region. A true recruitment partner, Millbank offers services ranging from contract and permanent placements through to fully managed services.

RMG

RMG is an award-winning headhunting consultancy with a difference - we make it our business to search and understand who's who in the Chemicals and STEM sectors and have the know-how to find talented people who will deliver lasting impact and add financial value to your organisation.

Science Recruitment Group

Experts in the recruitment of scientific, regulatory, quality, engineering and technical professional across all areas of the industry. Support in recruiting temporary, contract or permanent staff for your team.

TransitionPlus Ltd

Executive search for science-based organisations, talent development, outplacement and career transition support. Experienced chair, NED, coach and business development consultancy. The "Plus" is to ensure that considerable attention

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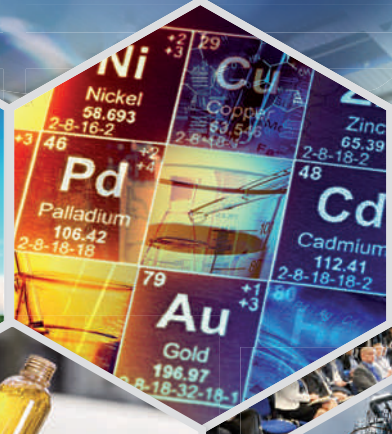


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Most would agree that good business performance is linked to good operational and process safety performance, built on sound practices and procedures.

At HFL Consulting, we provide a unique blend of leadership, management, consulting, engineering and training services, that makes us the natural partner of choice for many of the UK's most prominent chemical manufacturing and chemical using companies.

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HFL Consulting is now part of SLR; a global leader in environmental and advisory solutions. Together, we provide world-class solutions and advice to our clients.