Issue 22 Summer 2025

INSIGHT

Tank storage provides an essential interface between sea, road, rail and pipeline logistics.

Page 6

OIKOS STORAGE HOSTS MEMBERS OF 503 STRE (FUELS INFRASTRUCTURE) FOR TRAINING EVENT

The quarterly magazine from the Tank Storage Association

Also in this issue, we explore sustainability, digitalisation, emissions reduction, and the many projects and innovations that are taking place within the bulk storage and energy infrastructure sector.

Insight is published by the Tank Storage Association, the voice of the UK's bulk storage and energy infrastructure sector.

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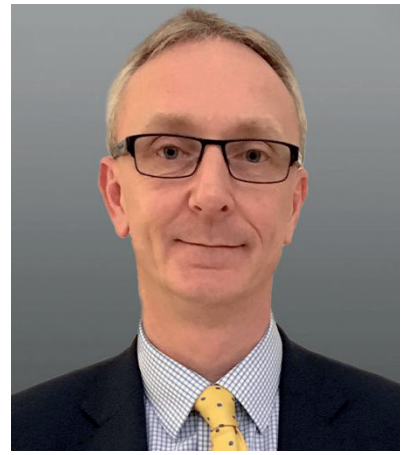

Peter Davidson
Chief Executive, TSA

Welcome to the summer issue of Insight. We are now firmly at the doorstep of a complex chapter defined by the need to deliver energy security and resilience, against the backdrop of shifting global dynamics, while also accelerating the journey toward net zero. The bulk storage and energy infrastructure sector plays an essential role in the UK's energy, transport, manufacturing, agricultural and food industries. Storage capacity also includes strategic reserves held for emergencies and supply disruptions. Our sector is also leading the drive in the journey toward carbon neutrality seizing opportunities through innovation, new technologies and collaboration. In this issue of Insight, we explore the many initiatives that are taking place in this vibrant industry as it looks to the future. I hope you enjoy this new edition of the magazine.

Contents

Page 4

UM INVESTS IN HULL TERMINALS

Bulk liquid storage specialist UM Terminals prides itself on flexing to meet the needs of new and existing customers.

Phil McEvoy, Terminals Director, UM Group

Bulk liquid storage specialist UM Terminals prides itself on flexing to meet the needs of new and existing customers. Nowhere is this more evident than at its Hull East and Hull West terminals, where it is coming to the end of a programme of investment and maintenance.

It is rare for there to be availability at UM's Hull terminals, but there are currently a limited number of tank hire opportunities, small to large, at the Hull East facility.

The available tanks would be suited to a range of products including gas oil, marine gas oil, industrial heating oil, HVO (Hydrotreated Vegetable Oil) and mineral diesel. Total capacity across the available tanks is 4,130 cubic metres.

The Hull terminals are part of the UM Terminals strategic capability across the UK with other terminals located at Liverpool and Portbury. Hull East comprises two sites, the main site and a dedicated methylation site. The main site provides multiple storage solutions with key products being base oils and lubricating oils while a more recent customer product requirement has involved storing caustic soda. Hull East also offers bespoke services such as product clarifying and blending and has its own dedicated shipping berth.

The methylation facility at Hull East is a lower tier COMAH establishment with bulk storage tanks consisting of Ethanol, Isopropyl Alcohol and Methyl Ethyl Ketone. Bulk products are received by ship to a dedicated shipping berth and taken out by road.

UM's Hull West terminal provides storage for molasses, vegetable oil and fertiliser products, offering a range of solutions with heated and non-heated storage tanks. The terminal also offers a deep-water berth and dedicated shipping pipelines.

Hull East's terminal manager is Ben Maynard, who has been with UM for eight years progressing from operator to his current role. He is supported by six operational staff.

Terminal manager at Hull West is the highly experienced Mike Mail, who has been with the company for 35 years. Mike is also supported by six operational staff.

Ben said: "The programme of investment has been across both sites and has partly been about maintenance to ensure our facilities continue to be of the highest possible standard, but also to meet some of the bulk liquid storage requirements of newer customers which have been onboarded more recently.

"The company's ethos is all about having a can-do attitude and going above and beyond to meet our customers' needs. We pride ourselves on building long-term relationships and we have many examples, not just in Hull but across all our terminals, where we have grown with our customers.

"Our Hull terminals are ideally located with sea freight proximity to ARA (Amsterdam, Rotterdam and Antwerp) and optimised inland road logistics and motorway links to all parts of the UK."

Mike said: "I have seen a lot of changes to our industry over my 35 years with UM Terminals and this latest programme of investment is about ensuring that we are able to respond to the needs of customers, many of whom are local and who we have built personal relationships with over the years."

The investment at Hull follows a similar programme at UM's Regent Road terminal in Liverpool last year.

This included upgrading several tanks to keep up with the demand for storage in the region.

One major enhancement at Regent Road saw the introduction of dual dock loading with customers now able to load and discharge cargo at Huskisson Dock and Canada Dock, reducing delays due to congested shipping berths.

The investment has also supported UM Terminals' expansion into a broader range of products which now includes chemicals, industrial oils, vegetable oils, fertiliser and key growth areas of biofuels and biofuel feedstocks.

The company is also underway transferring across to low carbon tank heating technology, part of the wider UM Group's sustainability strategy.

Phil McEvoy, UM Group Terminals Director, said: "There has been and continues to be significant investment in our terminals business, both in the UK and worldwide, and we are committed to further cementing our reputation as a world-leader for providing bulk liquid storage and logistical solutions.

"Our GB business operates seven terminals located in Liverpool, Hull and Portbury, all strategically situated to meet the logistical opportunities and challenges facing customers.

"We are committed to partnering with our customers and this includes a willingness to invest in the right opportunities to ensure the facilities and services we provide match our customers' requirements.

"We pride ourselves on the quick turnaround from customer enquiry to product in tank, finding the right solutions to meet their varied logistical challenges.

"The investment across our terminals helps us to achieve a number of important objectives, namely meeting the needs of our customers, including new ones we are onboarding, ensuring our capabilities are the best they can be, having the right capacity and meeting our sustainability obligations."

In addition to its bulk liquid storage capability, UM's value-added services include biofuel feedstock pre-treatment, blending, water dilution, product packing, HMRC bonded warehouse and COMAH compliance.

Anyone interested in finding out more about tank availability in Hull should contact Vic Brodrick, UM Terminals' Managing Director: +44 (0) 151 933 1010 or email vic.brodrick@umgroup.com

www.umterminals.co.uk

OIKOS STORAGE HOSTS MEMBERS OF 503 STRE (FUELS INFRASTRUCTURE) FOR TRAINING EVENT

The training event at the Oikos storage facility shone a spotlight on the wider context in which the sector operates while also focusing on tank terminal operations and processes.

For well over eight decades, Oikos has been operating a 70-acre bulk liquid storage facility on Canvey Island, in the South East of England. Located on the River Thames estuary, the terminal is recognised as a nationally significant marine fed oil, fuel and bulk liquid import and storage facility.

With a substantial storage capacity of 300,000 cubic meters, two marine jetties, and round-the-clock operativity, the Canvey Island terminal is also one of the most technologically advanced storage facilities in Europe and the only independent facility in South East UK connected to two national fuel distribution pipeline networks. Access to national road networks, shipping routes and the UK's key fuel distribution pipelines, enables Oikos to supply vital road and aviation fuels to industry and national airports - including Heathrow, Gatwick, and Stansted airports - as well as other storage facilities across the country.

The terminal also connects the UK to the European fuel supply distribution networks through links to the Antwerp-Rotterdam-Amsterdam (ARA) region and receives products from other international ports.

On Saturday 8th March 2025, the site provided the backdrop for a Special to Arms training event for members of 503 (Fuel Infrastructure) Specialist Team Royal Engineers, STRE. 503 (Fuel Infrastructure) STRE is a British Army Reserve sub-unit within 65 Works Group (Wks Gp) Royal Engineers, providing specialist fuel infrastructure capability to 12 (Force Support) Engineer Group. Its niche expertise complements the Regular Army's 516 (Bulk Petroleum) STRE, making it one of the only military units dedicated to fuel supply infrastructure. Operating as an infrastructure organisation focusing on operations and exploration roles, 503 (Fuel Infrastructure) STRE possesses core engineering, planning, and process skills for managing major shutdowns including the operations and maintenance of large gas, oil, and petrochemical facilities. Members of 503 STRE are specialists capable of delivering these roles and the team composition required for operating or shutting down large oil and gas facilities is regularly reviewed and updated accordingly. Regular assessments ensure that the unit maintains relevant competencies to support military and reconstruction efforts.

The Special to Arms training event afforded the opportunity to the

13-strong 503 STRE contingent to deepen its understanding of a live fuels terminal whilst undertaking infrastructure reconnaissance activities at the Oikos bulk liquid storage facility. Training on the day focused on both theoretical and practical elements of fuel terminal processes as well as on operations and maintenance activities to ensure safe operations.

"This important initiative serves to highlight the vast benefits of collaboration whilst providing an opportunity to explore the key role that the bulk storage and energy infrastructure sector plays in security and supply resilience, as well as in supporting a complex network of actors, from domestic industry players to residential consumers and international traders" said Arun Sriskanda, Managing Director of Oikos. "Bulk liquid storage terminals are an integral part of a complex web of global activities and a key part of international and regional supply chains and domestic industrial ecosystems. The training event at the Oikos storage facility shone a spotlight on the wider context in which the sector operates while also focusing on tank terminal operations and processes, including marine loading and unloading, storage, distribution and safety, as well as maintenance activities to ensure the safety of operations".

Captain Paul Middleton - who coordinated the training day - emphasised the importance of Special to Arms training events to help fuel engineers from 503 STRE develop a

broader and more comprehensive understanding of a live fuels terminal while allowing the team to "come together and learn from each other". "This level of collaboration allows us to build connections, develop meaningful training and supports relevant knowledge sharing", said Captain Middleton. "It also allows us to raise awareness of 503 STRE and the opportunities available to engineers specialised in gas, petrochemicals, pipeline, bulk storage and extraction to join the team, particularly against the backdrop of our current recruitment drive".

WO2 Andy Hulse pointed to the importance of training in bolstering the team's capability as regards infrastructure assessment, including utilisation and impacts of loss of infrastructure, in both a military and civilian context. "Training is key for our soldiers to be able to move into a potential live scenario and utilise the tools developed. The day also provided an opportunity for the team to gain a deeper understanding of the UK's national infrastructure - as well as critical national infrastructure – and how it relates to the global context".

For Cpl Matt Allhusen and LCpl Nana Acquaisie, the day provided an important opportunity for 503 STRE members to not only broaden their expertise but gain hands-on experience while also reflecting on potential real-life scenarios. "This type of training affords an opportunity to have a more realistic, real-time understanding of the type of scenarios we could be encountering", said LCpl Acquaisie. "It also gives us exposure to different people and places, allowing us to forge connections and gain greater knowledge of other industries within the fuel sector, which can open up further lines of interest for the team" added Cpl Matt Allhusen, noting that "it is quite important to get hands-on experience of live fuels infrastructure also for those who might not necessarily have a fuels background, as there might be crossovers and significant interconnections with other infrastructure sectors".

"The theme of collaboration echoed prominently throughout the day," said Arun Sriskanda. "It was clear that everyone benefited from the visit, and we continue to be committed to further opportunities to support learning and a wider understanding of our sector in the UK."

For more information about Oikos Storage, please visit www.oikos.co.uk

For more information about 503 (Fuel Infrastructure) STRE, please visit www.army.mod.uk/learn-and-explore/about-the-army/corps-regiments-and-units/engineering/corps-of-royal-engineers/65-works-group-reserves/

Securing the future of Tank Storage: Teamwork Security and Training Services

In the ever-evolving and high-risk world of tank storage, ensuring robust site security is not just a regulatory requirement, it's a business imperative. From fuel depots to chemical storage facilities, the need for vigilant, highly trained personnel has never been more critical. That's where Teamwork Security and Training Services steps in.

With a proven track record across critical infrastructure sectors, Teamwork Security and Training Services provides expert security staffing solutions, tailored specifically to high-stakes environments like tank farms and industrial terminals. Their approach is grounded in one core principle: security isn't one-size-fits-all. Every facility has unique vulnerabilities, and Teamwork Security and Training Services work closely with clients to identify those risks and deploy staff with the specific skills and awareness needed to manage them.

Teamwork Security and Training Services security operatives are SIA licensed, rigorously vetted, and receive continuous professional development, including industry-specific safety training. Whether it's perimeter surveillance, gatehouse control, or emergency incident response, their staff are equipped to handle complex scenarios with professionalism and precision.

What sets Teamwork Security and Training Services apart is their deep understanding of high-hazard industries. Many of their personnel have prior experience in sector bringing not just security expertise, but operational awareness and safety-first thinking to the job. Their teams integrate seamlessly with site protocols, regulatory frameworks, and third-party contractors, ensuring minimal disruption and maximum compliance.

Learn more: www.teamwork-security.co.uk/security-staffing
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WASTE NOT, WANT NOT: AUGEAN IS ADVANCING THE CIRCULAR ECONOMY IN COMPLEX, REGULATED MARKETS

As the UK aspires to a more circular economy, the waste-management sector plays a crucial role in driving sustainability and supporting net-zero targets.

Gary Bower, Director of Corporate Stewardship, Augean

As nations grapple with stretching net-zero targets, investors are increasingly viewing companies with highly developed environmental, social, and governance (ESG) strategies as less exposed to risk and better placed to deal with uncertainty in the future.

So it is no surprise that 90% of organisations plan to increase their ESG investment in the next three years, according to 2024 research from KPMG. More than three-quarters of companies also stated plans to reorganise business lines to ensure that ESG targets and business strategy are more closely calibrated.

Central to the concept of ESG – and the global energy transition – is moving away from a linear economy and embracing a circular one. Statistics from the Ellen MacArthur Foundation, a charity working to accelerate the transition to a circular economy, show that the world will only achieve 55% of its net-zero objectives through renewable energy and energy efficiency. Tackling the remaining 45%, says the foundation, will require the circular economy.

One organisation that is advancing the circular economy in complex, regulated markets is Augean. Founded in 2004, Augean specialises in managing hard-to-handle wastes across the energy, nuclear, petrochemical, manufacturing, utilities, construction and cement sectors. Augean has published the Corporate Social Responsibility Report every year since it was formed. Yet for the circular economy to flourish, legislation and law enforcement surrounding waste crime – which costs the UK taxpayer £1bn a year according to 2021 data from the Environmental Services Association, 2021 – must be tightened.

"The circular economy also needs to recognise the myriad of challenges that responsible companies, who wish to comply, face," says Gary Bower, who is director of corporate stewardship at Augean. "Policy should encourage companies to create materials that use the fewest hazardous chemicals. So, policies that reflect the need to create the least waste possible is the first principle." From the perspective of companies operating at ground level, Bower notes that organisations promoting a regenerative approach need to be able to turn words into action.

"Companies must actively engage and work with local communities, parish councils and regulators to promote

Restored northern slope of Augean's ENRMF landfill

a culture of good governance, transparency and accountability," says Bower. "Earning the trust of the community and regulators requires a lot of hard work but it is the best way to create a positive legacy."

Thirdly, Bower believes there is a genuine need for industries such as the energy sector, the construction industry and many other trades "to understand their waste better".

"Many companies, particularly those in hard-to-abate sectors, outsource brokers to manage their waste," he says. However, Bower explains that if leaders have a holistic understanding of what is in their waste, and why it was produced in the first place, it makes Augean's job easier. "Then, we can work in partnership with the organisation to achieve a much more effective circular outcome."

Exploration and decommissioning in the oil and gas sector provides a good example of the circular economy in action. By removing oil from drill cuttings at its facility in Peterhead, Augean can use the recovered oil, which in 2023 totalled over 318,000 litres, to power the machinery used to recover the oil in the first place, with any excess sent to third parties to produce processed fuel oil.

However, not every material can be cycled back into the economy after use. An example is battery black mass recycling, which recovers components and valuable metals such as lithium and cobalt from end-of-life batteries. However, the process also produces small quantities of residues that cannot be recycled and need to be safely managed.

While the safe and sustainable management of such residues is crucial, it is often an unconsidered part of the circular economy. Bower notes that this is a challenge that Augean has proactively sought to mitigate, building disposal facilities engineered

to the highest standards and strictly monitored under the Environmental Permitting Regulations regime.

"Our landfills ensure that materials are held safely and not allowed to leach into the environment. They could be potential resource banks for heavy metals that could become exceptionally rare in the future," says Bower. "All of the wastes have been analysed prior to deposit, they could potentially be recovered in the future if appropriate advances in technology make this viable. This further demonstrates our commitment to contributing towards a national circular economy."

The sustainable impact of the circular economy is a cornerstone of Augean's strategy, and it is one that extends to the impact the company can have in delivering energy security as a downstream operator in the UK waste market.

As the UK pursues clean energy and security through large-scale nuclear plants and small modular reactors, managing radioactive waste remains a critical challenge. A significant portion of this waste is classified as low-level radioactive waste (LLW). It has been government policy since 2007 for LLW to be disposed of into suitable landfill sites where rigorous safety checks have been made to ensure it will be safely managed. Augean is one of the few UK waste operators licensed to carry out this important work and handle LLW. The company also treats metalwork to remove surface radioactive contamination, rendering it safe for recycling while ensuring the remaining LLW is disposed of securely.

Additionally, Augean plays a vital role in managing Air Pollution Control Residues (APCr) from Energy from Waste (EfW) plants, which are currently vital to the UK's energy security. These plants rely on abatement systems that generate APCr to prevent harmful emissions. Augean's significant market share in handling these residues not only ensures the continuous operation of EfW facilities that supply power across the country, but makes Augean a nationally significant infrastructure provider in the waste management space.

For business leaders, partnering with expert waste management firms like Augean is not only a compliance measure but a strategic move toward achieving ESG goals. As regulations evolve and the push for a circular economy intensifies, having a trusted partner ensures operational resilience and sustainability. Aligning with such partners is crucial for safeguarding both the future of the organisation and the planet.

For more information please visit www.augean.co.uk

This article first appeared in Raconteur (www.raconteur.net)

Future Industrial Services Fleet Support

DEGASSING AND PURGING SERVICES FOR INLAND AND MARITIME SHIPPING

Reducing emissions and enhancing sustainability in the marine and shipping industry.

ETS Degassing
MOBILE EMISSION TREATMENT

David Wendel, Managing Director, ETS Degassing

The handling of volatile substances and fuels poses significant challenges regarding safety, environmental compliance and operational efficiency in the maritime and shipping sector. Vessels in both inland and deep-sea shipping that carry chemicals, fuels, LNG, or other sensitive cargoes need to be safely prepared before critical operations.

For example, residual gases and vapors from previous loads, volatile organic compounds (VOCs) or hazardous air pollutants (HAPs) must be removed to avoid health risks, explosions and non-compliance with environmental regulations. Only when a tank is completely gas-free, technical inspections, maintenance or product changes can begin safely and efficiently. In order to dispose of residual gases in an environmentally-friendly way, the degassing of cargo and fuel tanks is an essential task for vessels. This reduces operational risks, prevents delays, and helps operators to meet international safety and emission standards.

Efficient emission treatment solutions for the shipping industry

As environmentally friendly processes and reducing emissions is an important factor for maritime operations, ETS Degassing offers highly flexible services for the degassing and purging of ship tanks and vessels. Thus, we ensure that vessels are gas-free before critical operations such as product change, loading and unloading, or scheduled maintenance.

To fulfill the emission reduction and control needs in the marine and shipping industry, we deploy efficient and flexible mobile solutions. Our mobile vapor combustion units destroy gases, gas mixtures and vapors from the explosion groups IIA, IIB and IIC with an efficiency of over 99.99%. The units as a trailer or container can be trailer-mounted and are therefore easily transported and highly flexible. The mobile vapor combustion units can be applied for degassing operations and the temporary replacement of stationary emission treatment systems such as vapor recovery units (VRU). Our technology portfolio also includes a mobile vaporizer with nitrogen storage tank that can be applied for inerting and purging. It is especially suited for working with liquefied gases such as LNG, ammonia or propane, creating a safe working environment by purging.

Preparing vessels for product changes

Efficient changeover from one product to another is essential in commercial shipping to maximize vessel utilization. Residual gases from the previous cargo can pose

a contamination risk or even ignite when in contact with the next load. Thus, residual gases, VOC emissions and other hazardous gases from the previous loading in tank atmospheres need to be extracted and treated. The degassing process eliminates flammable, toxic, or environmentally damaging vapors and reduces the vessel's downtime between deliveries. Degassing ensures product changes and transitions in oil and chemical tankers, bulk carriers, container ships and inland barges are smooth, fast, and compliant with all relevant regulations.

Preparations for maintenance and repair

Before a vessel can undergo maintenance, tank inspections, or repairs – especially when welding or hot work is involved –, tanks must be gas-free. Removing all residual gases from the tanks by degassing prepares ships and tanks for this process by bringing vapor concentrations below the Lower Explosive Limit (LEL). Once achieved, certified gas-free status allows shipyards and onboard teams to proceed safely with structural or mechanical work. Whether the ship is docked at a yard, moored at a terminal, or undergoing onboard repairs, ETS Degassing can deploy mobile vapor combustion units and nitrogen vaporizers directly to the site.

Support for loading and unloading operations

We also deploy our mobile vapor combustion units to support operations when a stationary vapor recovery unit (VRU) needs to be taken down due to maintenance or repair. Instead of stopping the operations during the VRU downtime, the mobile vapor combustion unit can take over the task of treating developing emissions. Thus, operations such as loading and unloading of ships and vessels can continue without interference.

Degassing LNG fuel tanks and helping in LNG cool down operations

LNG is becoming increasingly important as an alternative energy source and fuel. Transporting LNG in ships and using it as a marine fuel has also brought new challenges – for example, it is necessary to degas LNG tanks before maintenance, cleaning or repair. LNG tanks, too, need to be gas-free before product change or maintenance. A special challenge in working with LNG are the boil-off gases. As LNG is stored close to the vaporization temperature, even a small amount of heat can lead to slight vaporization of the cargo. Despite the insulation of the tanks, it is not possible to completely prevent heat from entering the LNG tank from outside. When some of the LNG changes from a liquid to a gaseous state, boil-off gases are produced – partly during storage and especially during unloading. Residual gases therefore remain after the LNG tanks have been emptied and must be controlled and safely removed before product changes, maintenance work or decommissioning of the tanks. Mobile gas treatment technologies such as degassing and purging are ideal for this task.

Our mobile vapor combustion units are therefore suited for the degassing of LNG storage tanks and LNG fuel tanks as well. As LNG is stored in liquid state at a temperature of around -160°C, it is therefore necessary to cool down LNG tanks before refilling. During LNG cool down, boil-off gases are produced, too: as a small amount of LNG is deliberately sprayed into the tank, some of the gas vaporizes. The resulting boil-off gases must also be treated in a controlled manner. Otherwise, material stresses, cracks or malfunctions could occur – especially with the sensitive cryogenic components. In addition, oxygen must be removed from LNG fuel tanks before each loading,

maintenance work or inspection. To ensure a safe working environment, the oxygen content inside the tank must be reduced. LNG fuel tanks can be flushed with nitrogen for this purpose – as an inert gas, nitrogen does not cause any undesirable reactions such as oxidation and displaces the oxygen. By applying the mobile nitrogen vaporizer and optionally combining it with a mobile vapor combustion unit, we also offer LNG cool down operations.

Practical insights into applications in the marine and shipping industry

ETS Degassing has supported numerous applications across both inland vessels and deep-sea ships. For example, a major deployment for us was the degassing of a tanker loaded with LNG in the Netherlands. After a heavy storm and a collision, the ship was damaged and had to be repaired in the ship yard. To start the works, the ship had to be gas-free and was not allowed to contain any LNG. We took over the degassing of the tanker with two mobile vapor combustion units. After the repair was completed, we have degassed and purged the ship once again to prepare it for the refilling with LNG. In the Port of Rotterdam, we have also carried out the LNG cool down of a major cruise ship on short notice. We were notified on a Friday evening, our operators were already on site on Saturday morning. Around midday, the operation had started and was finished in the night on Sunday.

For the degassing and purging application during the cool down, we have applied a mobile vapor combustion unit, a mobile nitrogen vaporizer and additional equipment.

In a shipyard in the Netherlands, we have degassed and purged LNG fuel tanks on board of a tanker with a mobile combustion unit and a mobile nitrogen vaporizer. After the degassing was completed, we have also carried out the LNG cool down. In another application in the Netherlands, we have degassed the LNG fuel tanks on board of a ship, applying a mobile vapor combustion unit and a mobile nitrogen vaporizer.

In the Port of Amsterdam, we have replaced a stationary VRU during its downtime with a mobile vapor combustion unit. The unit treated the emissions and vapors that developed during ship loading. Thus, it was possible to uphold operations without interruptions. In another VRU replacement in the Port of Amsterdam, our mobile vapor combustion units took over the gases of the ships and carried out the breathing of the storage tanks. Another VRU backup for ship loading lasted for several months: two of our mobile vapor combustion units were stationed in the port long-term to take over and treat the developing vapors during the ship loading.

Furthermore, we operate a degassing and purging station in the Port of Duisburg, Germany. The site in the world's biggest inland port offers inland waterway vessels, barges, gas tankers and motor tankers on the river Rhine the possibility to dispose of residual gases in an environmentally-friendly and legal way. Our site is permanently equipped with a vapor combustion unit and a nitrogen vaporizer and helps the Port of Duisburg to enhance sustainability and efficiency in shipping processes. It is also the first and only barge degassing site in Germany. Vessels of all nations can be degassed and purged in the ETS Degassing site in the Port of Duisburg. The range of products that the vessels in our site had previously carried included for example petrol, naphtha, butane or pentene.

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CORROSION UNDER INSULATION (CUI) IS RETIRING AFTER YEARS OF BAD BEHAVIOUR

TICs are significantly easier, faster and safer to apply than installing bulky exterior insulation systems.

SHERWIN WILLIAMS®

Neil Wilds, Global Product Director – CUI, Sherwin-Williams Protective & Marine

Most people in the industry are way too familiar with the infamous rap sheet associated with Corrosion Under Insulation (CUI) – how it seeks out insulated storage tanks that need to be maintained at elevated temperatures and insidiously undermines their integrity.

The traditional insulation system for maintaining tanks at elevated temperatures takes a lot of work to install. Pieces of mineral wool have to be cut and fitted to the asset, pinned and banded in place; then, cladding has to be installed on top of the mineral wool or other insulating material.

After all that, the system is quite effective at maintaining elevated temperatures in the tank – that is, until the insulation gets wet, which is inevitable. Moisture is the nefarious accomplice of CUI. It takes only months, not years, for moisture to make her way past the cladding and into the insulation. Then, the insulating properties of the whole system plummet. When the mineral wool reaches 10% water by volume, the loss in R-value can be as great as 85%.

Moisture is laughing maniacally at this point. You see, she has already reached the tank surface and brought along a witch's brew of minerals and electrolytes. Now she's just languishing in this warm environment. She has nowhere to go, really, and she knows, with a little time, CUI will show up to do his dirty deed.

This villainous pair have performed their vile act countless times, to the chagrin of engineers, installers and asset owners, but now they have encountered an insurmountable barrier. Instead of the traditional systems of mineral wool insulation and cladding, they are up against the latest generation of Thermal Insulative Coatings (TICs) (Figure 1). For example, the TIC Heat-Flex® Advanced Energy Barrier (AEB) from Sherwin-Williams Protective & Marine can maintain operating temperatures up to 177˚C (350˚F), with excursions to 204˚C (400˚F). In these temperature ranges, the insulating properties of Heat-Flex AEB are comparable to a traditional system when newly applied (before it inevitably becomes wet).

TICs offer many benefits over traditional systems, but the main one is that moisture and CUI are given no asylum. First, the closed-cell structure of the coating film minimises the amount of moisture the coating

can actually absorb. Therefore, any absorbed moisture will barely affect the coating's thermal performance. Second, even when TICs absorb moisture, it dissipates through heating and evaporation within 24 hours.

So, however regrettable, CUI's notorious role in the storage tank industry is becoming obsolete. His position is to be eliminated, and there will be no cake or party for this bad actor.

Application and safety considerations

TICs are significantly easier, faster and safer to apply than installing bulky exterior insulation systems.

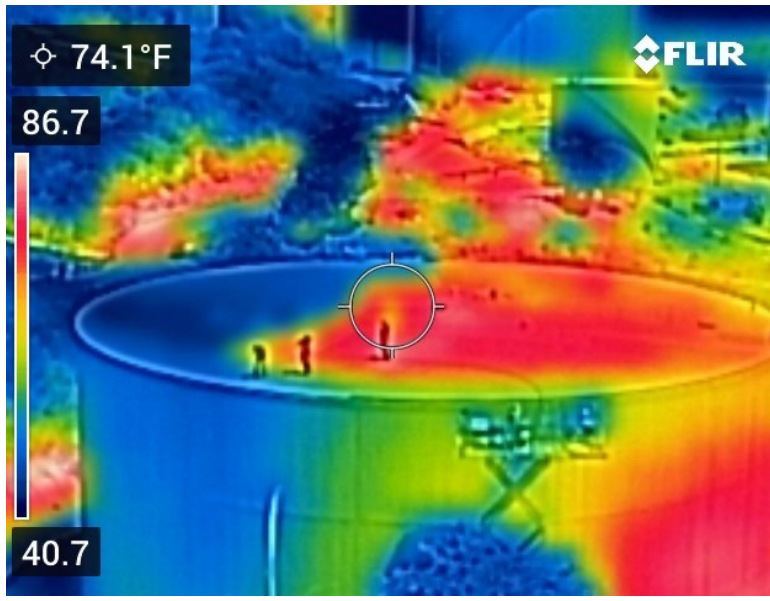
With traditional systems, the work may have to be performed in close proximity to hot assets because plant processes cannot be shut down during installation. By contrast, when applying a single-component TIC like Heat-Flex AEB, applicators can stand back at a safe distance from assets and spray the material onto the surface.

Once a single coat of the TIC is applied, the surface temperature of the asset will be reduced instantaneously, thereby removing any risk of burns. With Heat-Flex AEB, assets can be maintained at up to 148°C (300°F) during coating applications, which enables processes to continue running.

Application methods for TICs

Heat-Flex AEB is part of a coating

FLIR imaging of this ground storage tank being covered with a TIC demonstrates how well the coated areas (blue and green) retain heat compared to the noncoated areas (red and yellow).



Like storage tanks, heater treaters can be covered with TICs in place of traditional insulation systems to maintain process heat. This unit was first primed with Heat-Flex® ACE for corrosion protection and then covered with the TIC Heat-Flex® Advanced Energy Barrier (see below) to lock in process heat before being topcoated for aesthetic and durability purposes (see next page).

system with an approved primer, and like any system, it requires a clean substrate so it can adhere properly and deliver long-term service. Usually, some type of blasting is required to remove old coatings and any contaminants from the surfaces.

For a primer layer, Sherwin-Williams recommends a CUI-mitigation primer like Heat-Flex® ACE (Advanced CUI Epoxy) or Heat-Flex® 750. Heat-Flex AEB is applied on top and can serve as the functional topcoat, or another product can be applied on top of the TIC to improve aesthetics and durability.

When applying Heat-Flex AEB, multiple layers will be required, with a period for curing between them. Typically, you will be aiming for 5,000 to 6,250 microns (200 to 250 mils) dry film thickness (DFT) per coat and, in most applications, you'll need only two to three coats to achieve the coating system's target minimum of 70% heat retention.

Heat-Flex AEB is a single-component coating, so the OMA process applies: Open, Mix, Apply. Simply stir the material as directed and spray it on with no need for quality control checks.

No second acts for moisture and CUI

As a second-generation TIC, Heat-Flex AEB is a breakthrough technology that sprays on in layers, eliminating the arduous and sometimes dangerous application of mineral wool insulation and cladding. More importantly, for applications with temperatures at 177˚C (350˚F) or below, TICs are more effective at containing heat than traditional systems because once mineral wool becomes wet, which is inevitable, its efficiency as an insulator decreases greatly. While most operators have learned to live with wet insulation, accepting that it is less efficient and that CUI is a risk under such conditions, there is now another option. Moisture and CUI are no longer the titans they once were, acting in bold defiance of the operator's every effort. They will soon be toothless relics, living only in the mythology of an earlier era.

About the author

Neil Wilds is Global Product Director – CUI for Sherwin-Williams Protective & Marine. With 39 years of technical coatings experience, Neil develops strategies for long-term asset protection and directs the development of specifications and testing programs. He is a member of several coatings associations including AMPP, NORSOK M501, the International Organization for Standardization (ISO) and others.

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REIMAGINING TERMINAL INFRASTRUCTURE: VIRTUAL PLANT AS A KEY ENABLER FOR REPURPOSING TANK TERMINALS

The energy transition and shifting global trade flows are forcing operators of tank terminals to rethink how their assets are used.

GiZiL

The challenge and the opportunity

The energy transition and shifting global trade flows are forcing operators of tank terminals to rethink how their assets are used. Traditional terminals, once built solely for fossil fuels, are now being considered for alternative uses such as biofuels, chemicals, ammonia, CO2 capture, or even green hydrogen storage. But repurposing these aging facilities is no small task.

Legacy documentation, fragmented data systems, and physical access limitations all make repurposing complex, risky, and time-consuming. Terminal owners often face a lack of real-time visibility, making it difficult to assess asset conditions, plan layout changes, or validate engineering assumptions. Moreover, with increasing environmental and regulatory scrutiny — including stricter ESG compliance requirements and industrial safety directives such as SEVESO III in Europe or the U.S. EPA's Risk Management Program — planning errors can result in significant financial, legal, and reputational cost.

In this landscape of pressure and potential, terminal operators need smarter tools. That's where Gizil's Virtual Plant comes into play.

Virtual Plant is a digital twin platform purpose-built for asset-heavy industries. It allows terminal operators to visualize their sites in full 3D, enriched with tagged documentation and asset data, all built from laser scan point cloud technology. For repurposing projects, this becomes a powerful tool for minimizing physical risks, accelerating engineering planning, improving transparency, and ensuring alignment across internal and external teams.

The Virtual Plant not only supports the internal need for redesign and expansion but also enhances interactions with authorities, clients, and third-party stakeholders by offering a shared, visual, and data-rich source of truth. This collaborative approach reduces project risk, speeds up planning approvals, and helps terminal operators seize emerging opportunities in the energy transition faster and more confidently.

From static drawings to smart 3D environments

Most tank terminals still operate based on paper-based documentation or outdated CAD models. These static resources often don't reflect the as-is condition of the facility, especially in brownfield sites that have evolved over decades. This discrepancy between recorded and actual conditions creates uncertainty in planning, which in turn increases

risk and delays. With Virtual Plant, a laser scan of the entire terminal is converted into a highly accurate 3D model, representing the site "as built" – not just "as designed." The point cloud environment is then enriched with contextual metadata: P&IDs, inspection records, maintenance logs, permits, vendor documentation, and other critical information.

This enables planners, engineers, contractors, and regulatory stakeholders to virtually walk through the terminal, access asset-level documentation, and simulate different design and layout scenarios — all without stepping foot on-site. It also reduces the time and cost associated with traditional site surveys, repeat visits, and manual measurements.

The result is a visual workspace that enhances understanding and decision-making for complex repurposing projects. For example, a terminal operator preparing to convert sections of a facility for chemical storage used Virtual Plant to model containment zones, equipment reconfiguration, and pipe rerouting virtually, before any physical changes occurred. This led to earlier identification of spatial conflicts, more accurate cost estimations, and faster project approvals.

Safety, compliance, and stakeholder alignment

Repurposing terminals for new products or processes involves a high degree of safety and regulatory compliance. These projects often trigger new permitting requirements, hazardous material assessments, or safety case updates. Virtual Plant simplifies risk assessments and compliance reviews by offering an up-to-date, immersive model where safety zones, access paths, and isolation points are clearly marked. Because the platform is cloud-based and role-accessible, different teams — engineering, operations, HSE, third-party contractors, or regulators — can collaborate on the same digital environment. This fosters a single source of truth and dramatically reduces miscommunication or data silos.

Virtual Plant also aids in faster turnaround of required documentation for permitting and certification processes, especially when transitioning terminals for high-risk or environmentally sensitive products. Engineering contractors can perform clash detection, run constructability checks, and validate installation feasibility – all within the digital model.

Training is another area where Virtual Plant adds value. New staff, contractors, or inspectors can familiarize themselves with the terminal layout and critical systems through a virtual walkthrough. This not only reduces onboarding time but also enhances overall site safety, as teams are better prepared before they arrive on location.

Moreover, in times of heightened concern over cybersecurity and infrastructure protection, reducing the frequency of physical site visits by external personnel also contributes to physical security and operational resilience.

Delivering value across the lifecycle

Beyond the immediate design and planning phases, Virtual Plant continues to offer long-term benefits for terminal owners throughout the entire facility lifecycle.

Once the repurposing project is complete, the Virtual Plant remains as a living model of the facility. It can be updated periodically with new scan data or operational changes, providing ongoing value for maintenance planning, inspections, audits, and future upgrades.

Its ability to integrate with IT and OT systems — including ERP platforms like SAP, CMMS, and sensor networks — means that real-time signals and condition monitoring data can be layered into the model. This enables predictive maintenance strategies, better capital planning, and improved operational decision-making.

Virtual Plant also supports ESG and digital reporting obligations by centralizing and visualizing operational data in one platform. Whether it's reducing Scope 3 emissions from less site travel, or ensuring full traceability for inspection logs and permits, the platform becomes a tool for both performance and accountability.

Most importantly, Virtual Plant makes digital transformation achievable for terminals of all sizes. Unlike traditional digital twins that require heavy CAD modeling, long timelines, and high capital expenditure, Gizil's approach is fast, affordable, and built for the operational realities of brownfield environments.

As the energy landscape continues to shift, repurposing will become an

increasingly strategic capability. With Virtual Plant, terminal operators are not only managing change — they're mastering it.

About Gizil

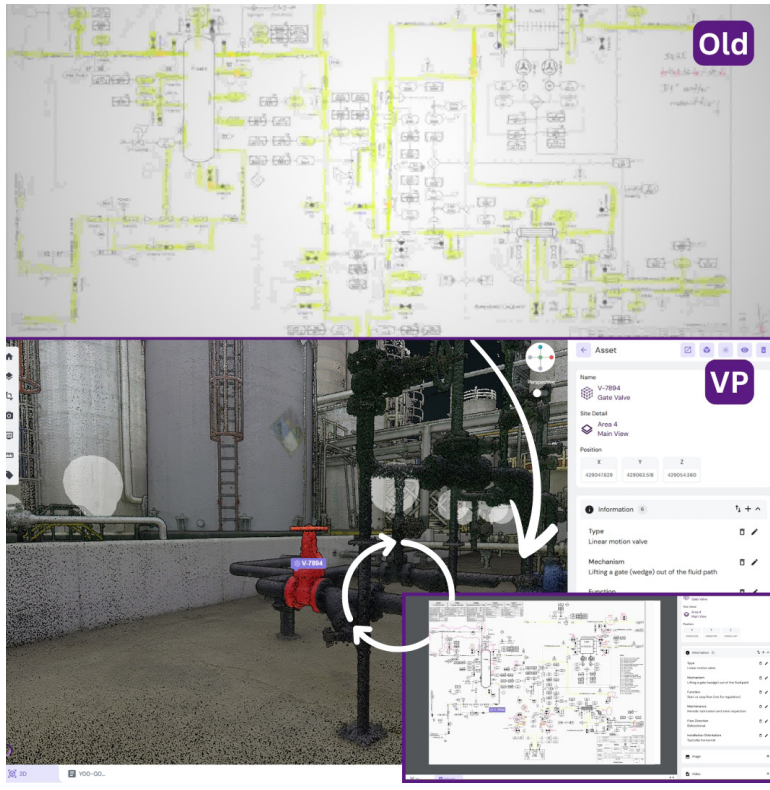
Gizil is an engineering-driven technology company revolutionizing industrial operations through its flagship SaaS platform, Virtual Plant. Rooted in deep engineering expertise, Gizil develops practical, scalable digital twin solutions tailored for the real-world complexity of asset-heavy industries.

Our mission is to bring Industry 4.0 to life — not with futuristic promises, but with implementable tools that work today. Virtual Plant bridges the physical and digital worlds using laser-scanned point cloud data, enabling fast and cost-effective creation of as-built digital twins that improve plant safety, compliance, and performance. Gizil operates in sectors such as chemicals, petroleum refining, energy, utilities, storage, and manufacturing. We help our clients digitize their infrastructure, optimize OPEX and CAPEX, and reduce carbon and safety risks while meeting growing ESG demands.

As a contributor to global industry standards and collaborative innovation networks, Gizil advocates for democratizing digitalization in brownfield environments. Our tools are designed by engineers for engineers — with a clear focus on usability, transparency, and measurable value.

Learn more: www.gizil.de

With Virtual Plant, a laser scan of the entire terminal is converted into a highly accurate 3D model, representing the site "as built" – not just "as designed."



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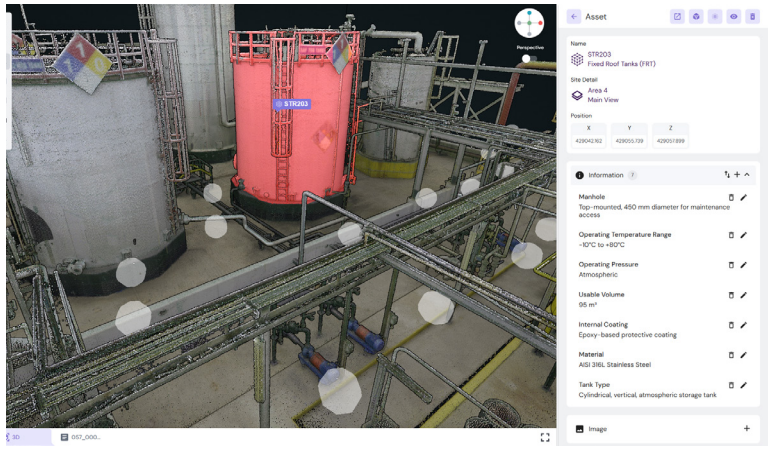


THE ROAD TO NET ZERO

At SLR, we work with our clients as a strategic decarbonisation partner.

SLR

Ports, terminals, bulk storage facilities, and associated logistics will play an important role in helping the UK meet its 2050 net zero goal. For example, developing sufficient capacity to safely store and transport a range of low-carbon and e-fuels such as ammonia, hydrogen, and sustainable aviation fuel (SAF).

In 2023, just under 5% of the combined 11.5 million m^3 storage capacity across TSA members was used to store low carbon fuels.[1] This will need to be accelerated as fossil fuels are phased out, and business models adapt to changing market demands.

In the meantime, alongside developing services and products which enable societal net zero, there is a need for TSA members to decarbonise their own operations, particularly across Scope 1 & 2 emission categories which are under direct operational control. Developing an actionable decarbonisation strategy is crucial to enable this.

Pitfalls

There may not be a universally 'right' way to develop a decarbonisation strategy, but there is certainly a 'wrong' way. Many decarbonisation strategies place heavy emphasis on a top-down 'suits' led approach, working mostly with corporate level stakeholders to set decarbonisation targets, which can ignore the realities of practical decarbonisation at site 'boots' level. Think CAPEX, OPEX, financing, green energy procurement, operational optimisation, energy efficiency potential, fleet decarbonisation, technological readiness - the list of considerations is broad.

Targets to action

A strong driver behind much of the target setting rush has been to demonstrate commitment to net zero by:

1. Setting targets which align with limiting global warming to 1.5° C.
2. Having targets validated by the internationally-recognised Science Based Targets initiative (SBTi).

In recent years there has been a pivot away from target setting to action.

Stakeholders including shareholders, funders, customers, and suppliers increasingly expect businesses to make good on their commitments and communicate progress – *if the goalposts need to be moved, or if targets haven't quite been met, why is that?*

A robust decarbonisation strategy will provide those answers, whilst looking at the most efficient path to net zero.

How SLR can help

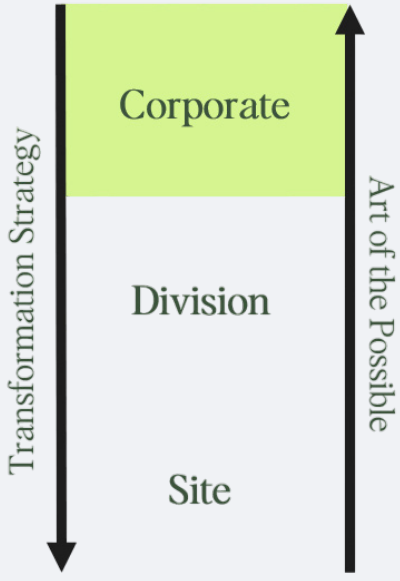
At SLR, we work with our clients as a strategic decarbonisation partner. We support them along their decarbonisation journey, providing multi-disciplinary expertise across:

- Energy & Carbon Advisory
- Process Engineering
- Civil Engineering
- Renewable Engineering
- Planning & Permitting
- Project Management

Engaging stakeholders

Instead of a 'suits' only focus, SLR engages stakeholders at corporate, division and site-level, leveraging a 'suits to boots' approach.

SLR – Suits to boots



By engaging with stakeholders across the business, we secure buy-in and a shared agreement on targets and objectives.

- ✓ Engage 'suits to boots'
- ✓ Collaborative approach
- ✓ Organisational buy-in
- ✓ Stakeholder satisfaction
- ✓ Realistic target setting
- ✓ Opportunity identification
- ✓ Risks and opportunities
- ✓ Drive action

TSA insights

Looking across the spectrum of TSA members, we have noted three key decarbonisation hotspots – fleet, distribution hubs, and terminals – and areas where SLR can support via insights or investigations.

Road fleet

- Tanker/HGV electrification strategy, going beyond simple "drop-ins", such as HVO
- Assessing vehicle movements and identification of optimal charging station siting
- Public sector charging joint ventures
- Techno-economic modelling

Distribution hubs

- Energy efficiency assessments
- Assessment of on-site renewable generation potential
- Low carbon fuel switching opportunities, for instance natural gas to electric heating (heat pumps or other electrified solutions)

Terminals/ports

- Energy efficiency assessments – tank insulation, pumps, leakages and losses, aged and inefficient legacy infrastructure
- Steam boiler efficiency, electrification potential and fuel switching
- Utility scale renewable feasibility studies 'in-front-of-meter'
- Process electrification and onshore power connections

Work with us

We can meet you at wherever you are on your decarbonisation journey, working with you towards your targets, from emissions baselining through to identifying opportunities, setting targets, securing investment, implementing projects and monitoring impacts.

For more information on how we can support, contact:
lee.jukes@slrconsulting.com

Reference

1. TSA Insights Magazine - August 2024 Edition.

SAFETY IN NUMBERS: HOW A SECTOR-WIDE PARTNERSHIP IS REWRITING THE RULEBOOK

The tank storage sector plays a pivotal role in the energy infrastructure, both in the UK and around the world.

But as the landscape evolves through energy transition, digital transformation and rising regulatory demands, it's clear that the way we train, qualify and progress our people must evolve too.

That's why Reynolds Training Services, in collaboration with SIAS and the Tank Storage Association (TSA), is leading a sector-wide initiative to build a new generation of qualifications and career pathways tailored to the needs of our high-hazard industries.

The initial development orbits around the Level 2 Diploma in Bulk Liquid Operations. The wider vision? To usher in a new era of industry-aligned qualifications designed not just for today, but for the challenges and opportunities of tomorrow.

Industry has spoken and, as a collective, we are listening.

Facing the skills challenge head on

Across the bulk liquid and tank storage sector, employers are confronting a shared challenge: legacy training frameworks no longer adequately reflect the skills and knowledge required for safe, efficient and future-facing operations. Whether it's managing hydrogen infrastructure, integrating process automation or responding to increasing regulatory pressure, the gap between classroom and site has widened.

Things are moving fast. So we're moving fast too.

The need for modular, industry-aligned qualifications has never been more urgent. Without them, businesses struggle to benchmark skills, operators face limited progression routes and the sector is falling behind as new fuels and technologies reshape operational expectations. The skills gap risks creating a safety gap and it's one that we, as an industry, must close.

A collaborative response

In response, Reynolds Training, SIAS, TSA and our collective partners have joined forces - you could say it's safety in numbers. Of course, our industry has seen its fair share of learning material rebrands masquerading as innovation. But this isn't a refresh. It's a ground-up redevelopment of qualifications, built on the foundations of real-world insight, technical rigour and genuine sector-wide collaboration. This is a root-and-branch rethink of what competence truly means in the high-hazard environment.

SIAS is a leading awarding organisation for STEM industries. As Managing Director, Steve Smith explains: "We are really committed to working with Reynolds Training and TSA, their employer partners and wider stakeholders to develop and take into market later this year a modern, modular, wider portfolio of qualifications to support the bulk liquid and tank storage sectors." The partnership, he continues, underscores "our mutual dedication" to delivering "high-quality training" that aligns with labour market demands across key UK industries.

A framework that works now and in the future

At the heart of this initiative is a modular makeover designed to build knowledge and capability in manageable stages. From foundation to management level, each qualification has been mapped

against real job roles, with clear progression routes that promote continuous upskilling, enabling our people to rise through the ranks safely.

The Career Pathways 2025 framework illustrates this approach, showing how learners can level up from Awareness to Intermediate, Advanced and eventually into roles that Manage others. It's about creating a circular economy of skills, knowledge and experience that passes from one generation, to the next and then the next.

These levels are reinforced by the TSA Proficiency Matrix, which defines not just what learners know, but how they apply that knowledge in increasingly complex contexts. In doing so, each qualification has been designed around several key principles:

- **Industry relevance**: Built on operational needs and mapped to occupational standards.
- **Progression**: Structured pathways from entry-level to advanced roles.
- **Safety and compliance**: A core focus, not an add-on.
- **Adaptability**: Future-ready content including digitalisation, automation and low-carbon practices.

The programme is being launched in phases, beginning with the Level 2 Diploma in Bulk Storage Operations and supported by a suite of awards already available on Reynolds

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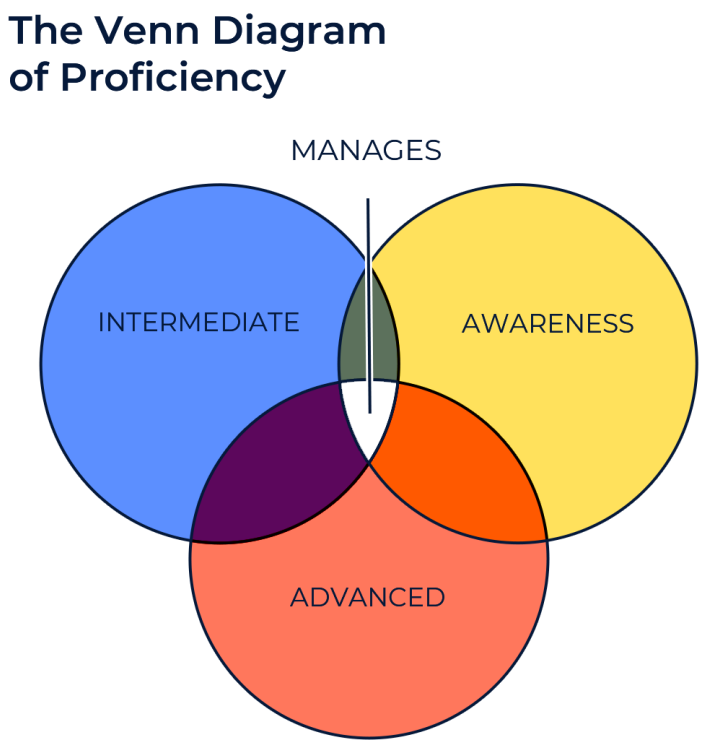

Training's website:

- Level 2 Award in Process Safety Awareness
- Level 2 Award in the Introduction to Hydrogen Safety
- Level 3 Award in Process Safety Operations
- Level 3 Award in Process Safety Management

These qualifications offer flexible delivery, digital assessment and real-world relevance. They mark a step-change in how operators are prepared for work on high-hazard sites.

Redefining competence

Alongside new qualifications, Reynolds Training has introduced a structured approach to defining and measuring competence. The Proficiency Matrix offers a functional guide to progression. It allows employers to benchmark performance and helps individuals see a route through the industry, whether they enter as a contractor, apprentice or mid-career technician.

John Reynolds, Managing Director of Reynolds Training, comments: "To equip the industry for the future, we must build from the ground up – structured pathways, modern standards and qualifications aligned to real-world needs. This isn't about box-ticking. It's about building competence, career mobility and long-term safety and process safety across the sector."

The inclusion of the TSA Skills Committee throughout the development process ensures sector-wide applicability. Crucially, it means that the qualification suite isn't formed in a vacuum, but rather shaped by those operating at the heart of the industry.

A new pipeline of potential

With the first phase of qualifications due to launch later in 2025, Reynolds Training and its partners are inviting employers to engage with the framework, explore how it fits their workforce development strategies and help shape future iterations. From your site to insights, this marks an opportunity to align learning with reality, close the skills gap and prepare our workforce for a safer tomorrow, today.

For more information, visit: www.reynoldstraining.com

Holistic Process Safety Support – from cradle to grave

As we move towards achieving net zero, our industry faces new and evolving challenges. The innovative technologies and processes create unknowns without precedent in existing industry or substantial operating experience to learn from. The new materials to be adopted with the decarbonisation process have distinct chemical properties and behaviours, which need to be understood such that the risks of handling them can be appropriately managed. There will also be a number of new entrants moving into the realm of process safety, who lack the experience and knowledge of working within the high hazard industries.

In order to effectively manage these developments, we believe that the existing toolkit for risk management should be implemented, applying established techniques in process safety management to evaluate the novel hazards involved. For new technologies utilising recognised tools can support effective risk management, to build our understanding as an industry.

RAS support a range of clients at different points in their operational timespan from brand new facilities through to aging assets. Different techniques and studies are applied at each stage within a plant lifetime, reflecting the unique risk to be managed throughout an establishment timeline. The start of the timeline may constitute pilot plants, new development projects through to brand new facilities and the risk management approach should be proportional to the risk and level of complexity: very complex plants with a higher risk profile will require a greater level of detail in any assessment versus a smaller, more straightforward process with low risk.

For an early-stage project, it is most important to understand material properties and consider aspects such as layout and location, such that inherent safety can be maximised. For an existing complex site there are unlikely to be significant gains from applying the same kind of thinking and more detailed hazard identification of the process will be most effective. We provide support to a number of our long-term partners, to manage their ongoing operational risks, including regulatory requirements and the evolving framework of industry accepted good practice. By applying the appropriate assessment throughout its lifespan, RAS provide cradle to grave process safety support to our clients, from new entrants to the high hazard industries through to operators of aging assets in legacy industries.

We do not believe that there is a one size fits all approach to process safety management, each site has a unique risk profile, and our holistic approach supports our clients in finding the best risk management solution for them. Our specialist advise is always tailored to each operation and their bespoke needs. We are pragmatic in our solutions, recognising the operational demands of the high hazard industries and that what may be practical for a newly designed plant may not be suitable for an existing asset and vice versa.

About RAS Limited

RAS Limited is a Chester-based process and technical safety consultancy with 30 years of experience across sectors including pharmaceuticals, energy, aviation, and chemicals. With a team of expert consultants, RAS is a trusted partner for managing complex risk in industrial operations and delivering long-term value. If you would like to get in touch, please email us here or go to our website: https://ras/ltd.uk.

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The voice of the bulk storage and energy infrastructure sector

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