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# Chemical Logistics: Primed for Growth

*Growing demand for U.S.-made chemicals sparks new opportunities, while aggravating capacity concerns.*



**F**or companies that make or ship chemicals, this is a dynamic era. The ongoing shale gas boom in the United States provides a steady, low-cost supply of raw materials used to manufacture a variety of chemicals. That has made this country a hot spot for chemical production, with demand from markets across the globe.

“The big story is low-cost natural gas liquids creating competitiveness here,” says Glenn Riggs, senior vice president, corporate logistics operations strategy at Odyssey Logistics in Danbury, Connecticut.

In late 2016, chemical production in the United States, not including pharmaceuticals, was expected to grow by 1.6 percent in 2016, by 3.6 percent in 2017, and by 4.8 percent in 2018, according to a report released by the American Chemistry Council (ACC).

As of March 2017, thanks to inexpensive shale gas, companies from around the world had announced plans to construct 294 new production units for chemicals in the United States, says the ACC. Those projects represent \$179 billion in new capital investment.

As production grows, so does logistics activity related to

chemicals. Chemical shipments will increase by 34 percent in the next five years, reaching \$1 trillion by 2020, the ACC estimates.

#### **Cost Affects Capacity**

Chemical manufacturers and distributors, along with their logistics partners, keep a careful eye on the price of natural gas and crude oil from U.S. shale fields.

“Those prices tell us the anticipated cost advantage of manufacturing in the United States,” says Nathan Buelt, general manager and coordinator of the Responsible Care program at ChemSolutions, the chemical logistics business of C.H. Robinson in Eden Prairie, Minnesota. As that cost advantage grows or shrinks, so does demand for equipment to move chemical products.

“Is there enough transportation capacity to support additional

production capacity?” Buelt asks. “And if there’s not, where will the gaps be?”

Transportation and logistics companies that serve the chemical industry are working hard to secure enough capacity to serve this booming market. For example, in 2016, Odyssey Logistics acquired Linden Bulk Transportation, a major tank truck carrier based in Linden, New Jersey. One asset that company brings is a bulk liquid depot near the Port of New York and New Jersey.

“We like that for the Panama Canal effect,” says Riggs, referring to shipments arriving on the East Coast through the newly expanded canal.

Odyssey has also enlarged a facility in Shanghai, China, where it serves chemical companies that need to ship small samples of their products to customers.

“Chemical plants aren’t designed to fill pint bottles; they are built to load barges, ships, and rail cars,” Riggs explains. Odyssey stores drums of its customers’ products and then, when an order comes in, fills a pint bottle and ships it with the necessary safety packaging



**Asset-based 3PL Rinchem safely and efficiently transports millions of pounds of chemicals, as well as hazardous and non-hazardous materials each year.**

and documentation. “We provide that service globally, but there was really a need in our Asia market,” he says. “We had started a couple of years ago in Shanghai, and we recently expanded the service.”

Rinchem, an asset-based third-party logistics (3PL) provider that specializes in chemical and gas supply chains, recently increased its transportation capacity by 36 percent and expanded its warehousing space by 32 percent.

“We have invested more in the past 18 months than we have in the previous 40 years of business, adding new sites in Atlanta, Tainan, Taiwan, and Pyeongtaek, South Korea, expanding in Hillsboro, Oregon, and Neot Hovav, Israel, and adding new gas storage facilities in Tualatin, Oregon, Phoenix, and Manor, Texas,” says Christopher Wright, vice president, sales and marketing at the Albuquerque, New Mexico-based firm.

Rinchem built the Taiwan and South Korea sites mainly to serve semiconductor manufacturers in those nations. Given the proliferation of smart devices connected to the Internet of Things (IoT), demand for microprocessors is growing, spurring greater demand for chemicals used in their manufacturing.

“Those materials make up more than half of our business,” Wright says.

### Competing for Equipment and Drivers

While low-cost fossil fuels create conditions that squeeze the transportation infrastructure for chemicals, the industry lives with a strange paradox: higher prices for natural gas and crude oil could make capacity even tighter. When prices for gas and crude rise, production increases in the shale fields. Then, energy companies and chemical companies compete for the same bulk liquid tanks.

“If crude spikes and creates an opportunity, does that capacity move back to oil and gas?” asks Buel. “If it does, what type of gap will that leave for the chemical industry, what are the alternative transportation modes, and what should chemical manufacturers do?”

Besides competing for equipment, the chemical and energy industries compete for qualified drivers. “There’s a structural shortage of drivers in the country, and oil and gas activity increases put pressure on chemical distributors like us, because we scramble to find good drivers to do the job,” says Tim Nicholson, president of PVS Distribution

Group, part of Detroit-based PVS Chemicals, Inc.

PVS Distribution uses a private fleet and common carriers—both over-the-road and rail—in its chemical distribution business. Its PVS Nolwood subsidiary is a full-line chemical distributor that provides custom services and makes many next-day deliveries. Its PVS Minibulk subsidiary installs 500- to 2,000-gallon tanks on customer sites and makes periodic deliveries to keep them filled.

Companies working in the shale fields need trucks to haul not just oil and gas, but also water and chemicals used in hydraulic fracturing. These energy companies and chemical shippers all require drivers with special qualifications. “We need experienced truck drivers with hazmat credentials who know what they’re doing,” Nicholson says.

Companies that ship temperature-sensitive chemicals in less-than-truckload (LTL) quantities face a special capacity challenge these days. “Right now, the chemical industry does not have a temperature-controlled LTL solution,” says Riggs.

The only companies that provided that service, Jevic Transportation and New Century Transportation, have gone out



of business. For safety reasons, chemical shippers can't share the temperature-controlled equipment used to transport food.

To fill the gap left by the defunct LTL carriers, Odyssey arranges shipments that rely on pool points and crossdocks. "We'll move a larger volume in a full, temperature-controlled truck, and then go to a regional breakout hub and do fast LTL local delivery," Riggs says.

For chemical loads of all types, ChemSolutions sometimes helps its customers overcome the capacity crunch by modifying their supply chains. "We talk to our customers about where their distribution points are," says Buel. "We discuss whether they have the option to co-manufacture with another facility, or to arrange their network to take better advantage of areas where we believe capacity might

not necessarily be as tight."

Third-party logistics provider Transplace provides capacity for its numerous chemical shippers through a chemical-dedicated fleet, operating exclusively in the Transplace network, that delivers hazmat, tanker-endorsement, TWIC card, and reefer capabilities for temperature control and/or protect from freeze services for water-based chemicals.

## Collaborating for Capacity

**B**ulk liquid chemicals shippers face an ongoing capacity shortage—in terms of both suitable equipment and qualified drivers—so it is critical that they collaborate more effectively with service providers and among themselves.

"If shippers in the marketplace don't collaborate quickly and efficiently with service providers, we will only run into other problems, especially in a contracting driver market," notes Mike Forbes, vice president of logistics solutions at Kenan Advantage Group (KAG) in North Canton, Ohio. KAG provides tank truck transportation and logistics management services for companies that ship fuel, chemicals, industrial gases, and food-grade products.

Collaboration can take many forms. At industry meetings, shippers and service providers have been sharing ideas about how to improve efficiency. Those discussions lead to specific initiatives that might involve several shippers or even several carriers.

For instance, in some cases, KAG and other bulk liquid carriers can establish programs to use each other's facilities to wash out their tanks after deliveries. "Not all carriers have wash stations at every location or key market," Forbes says. Such cooperation helps carriers bring

greater value to their customers.

In other cases, a carrier and shipper might join forces to eliminate empty miles in the supply chain by tying outbound finished product shipments to inbound raw materials. "A lot of best practice sharing and problem solving goes on through these collaborations," Forbes says.

Chemical shippers and their partners also need to think more broadly about their transportation options. "Everyone should continue to look for situations that help shippers eliminate the 'lumpiness' over a delivery week," Forbes says. "We need to consider programs that influence end users to accept loads on broader time tables, versus an '8 a.m. Monday' standard."

In the ongoing quest for greater efficiency in logistics, information technology is continually offering new capabilities. "One is to be able to anticipate and better provide predictability," Forbes says. "More and more, predictive analytics are becoming a component of decision making."



**KAG applies strict safety and security measures to its chemical services, and offers guaranteed capacity to meet shippers' needs.**

"In the past, what we called 'real-time data' wasn't actually real time; it had a lag to it in most situations," Forbes says. "Now, some of the applications collect and share data in actual real time. You can make predictions from that data, to make changes and anticipate different scenarios, which makes all parts of the supply chain more efficient and lean."

New mobile apps for operations, sales, and customer service also deliver benefits for chemical shippers and their transportation partners.

"For example, they let drivers provide more timely information about the shipments or unplanned events that could impact cost and service," Forbes says. "Mobility also extends sales and customer service activity any time, anywhere."



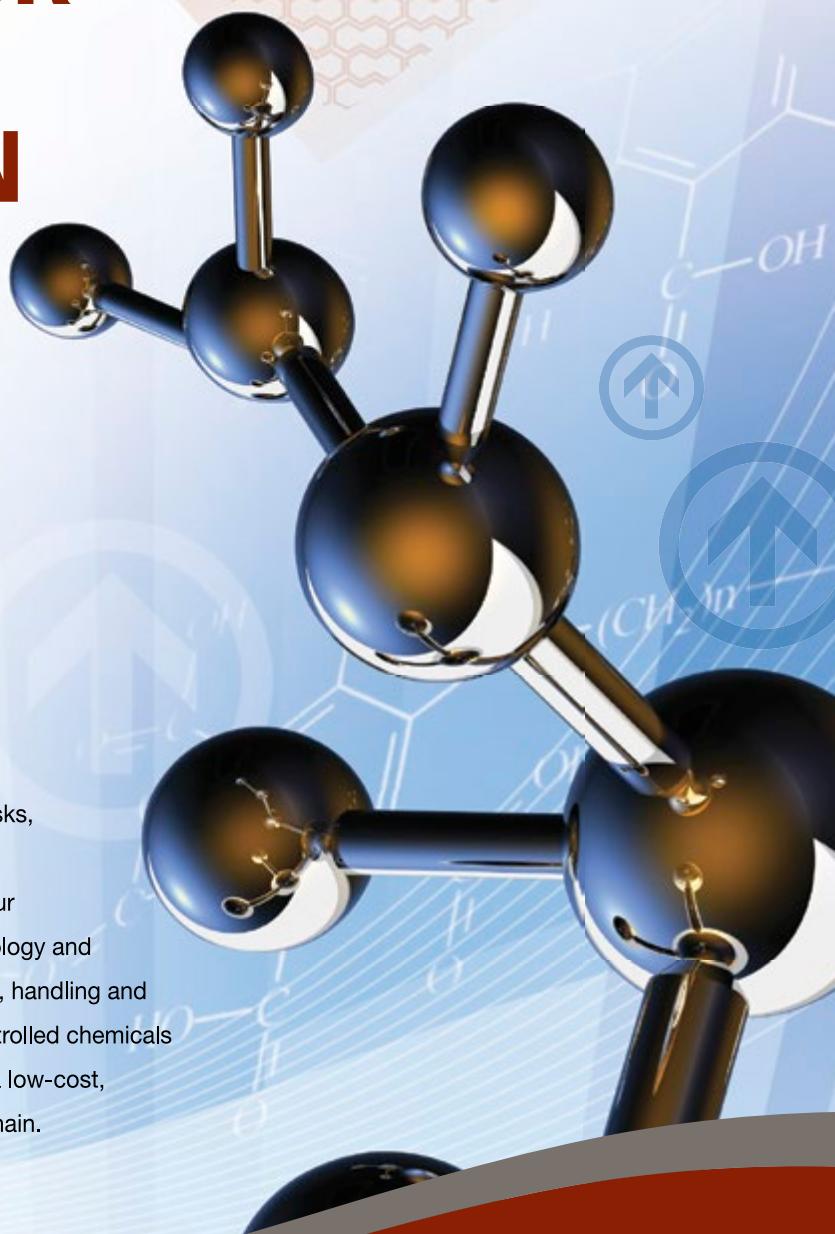
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### Safe and Sound

While capacity concerns wax and wane, another challenge for chemical shippers remains constant. "Safety is the most important aspect of our business," says Wright. "Without safety as a core principle, we're not able to be in business."

Safety is always top-of-mind for chemical shippers and their logistics partners, but the subject has gained even greater

worldwide attention since a series of explosions ripped through a storage facility in Tianjin, China, in August 2015.

"That incident further raised awareness of controls and safety in China, as a developing industrial country," Riggs says.

Shortly after the Tianjin disaster, Rinchem hosted a delegation from China that came to the United States to benchmark regulations and best practices. Conversations with the visitors made clear that while safety regulations in China and the United States are similar, compliance is a problem in China.

"You can have all the regulations in the world, but without strict compliance, people are going to be in danger," Wright says.

To encourage compliance at its own facilities, Rinchem has created a safety team at each site. "They meet regularly to talk about things

they're seeing and how they can improve safety," Wright says. "We've also instituted a zero tolerance policy for unsafe behavior."

The Tianjin explosions and other incidents have prompted the U.S. government to tighten both the design and the application of safety and security rules that govern the transportation and storage of chemicals. "Working with regulatory bodies to stay permitted and navigate the changing regulations becomes a lot of work," Wright says.

### The Outsourcing Option

For some chemical companies, the most convenient solution is to outsource functions such as storage to a logistics partner that understands all the ins and outs of compliance.

Increasingly tight safety and security regulations have prompted a trend toward more outsourcing

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## Flexibility Key to Managing 'Nick-of-Time' Demand

Given the nature of the materials, chemical logistics partners must often provide services that go beyond transportation and storage. Logistics partners serving the chemical industry may offer a variety of value-added services. At Linden Warehouse and Distribution Co., Inc. in Linden, New Jersey, for example, packaging is an important extra.

"We offer one-stop shopping for liquid packaging and fulfillment," says Jared Stadlin, vice president-client services at Linden. "Our automated filling line can fill everything from 2.5-gallon containers to totes or IBCs [intermediate bulk containers] of 250 gallons."

Linden operates approximately 1.2 million square feet of public warehouse space in Linden and Edison, New Jersey. In addition to its packaging capabilities, the company receives, inspects, and stores inbound product for clients and manages distribution to end customers.

### Chemical Specialists

Although Linden works with a variety of general commodities and retail products, chemical shippers make up a large part of its customer base. Its facilities include specialized space for materials that require temperature-controlled or flammable liquid storage, plus food-grade buildings for storing chemicals used to produce cosmetics or pharmaceuticals.

In the packaging operation, Linden works closely with local bulk carriers to transfer chemicals from tank trucks or intermodal bulk containers into pails, drums, or totes. "We conduct the filling operation on computer-controlled filling lines with integrated calibrated scales, which ensures the drums, totes, and pails consistently reach the desired fill weight," Stadlin says. Linden can also transfer liquids from drums or totes back into larger containers, tank



**At Linden, all equipment and trailers undergo stringent inspections and mandatory vehicle condition reports to ensure they can deliver for customers.**

trucks, or ISO containers.

Because Linden's warehouses are close to the Port of New York and New Jersey, which is preparing to receive larger ships that arrive through the newly expanded Panama Canal, Stadlin expects to soon start handling greater volumes of incoming freight. "More containers will be unloaded in a defined time frame," Stadlin says.

That increased inbound volume will compound the pressure that warehouse-based 3PLs feel today from customers that want to maintain as little on-hand inventory as possible. "Companies used to operate just in time," Stadlin says. "Often now it feels like we are shipping materials just in the nick of time."

The desire to maintain a continuous flow of product exactly when needed, while managing larger inbound volumes, means that shippers of all kinds need to operate with greater versatility and flexibility. But chemical shippers and their partners must become especially smart to succeed in this environment.

"Companies handling hazardous chemicals have a smaller universe of carriers available to ship them. So they have more scheduling challenges,"

Stadlin says. "They have to be adept at working with transportation management systems, SAP, or other enterprise resource planning systems while leveraging good relationships with carriers, to ensure materials are tendered and on the road on time.

"At Linden, we use all the tools at our disposal to satisfy our customers' needs," he adds.

### Ready and Able

It is also critical to have a well-trained staff. "Linden provides hazmat and GMP (Good Manufacturing Practice) training to our customer service and operations colleagues so we're able to prepare the shipping paperwork, offer placards, and communicate intelligently with carriers," Stadlin says.

In addition, shippers or their 3PLs must know how to comply with labeling requirements. "When working in an abbreviated delivery window, shippers and 3PLs have to make sure they deal with a provider that has the knowledge and resources to inspect the material, and make sure it is properly labeled and ready for shipment in the desired timeframe," Stadlin says.

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among chemical manufacturers and their customers. "They have to make a choice between investing in their manufacturing process and product development, or dealing with all the regulations, including the infrastructure and training," Wright says.

Companies that belong to the ACC participate in its Responsible Care safety initiative, following guidelines designed to enhance safety, security, and environmental responsibility. Since 1990, Responsible Care companies have reduced their rates of recordable injury and illness by 79 percent, according to the ACC.

Companies that participate in Responsible Care go through an audit every three years to certify their compliance. "All of our business units that touch chemicals are part of that certification," says Riggs. "It's about a two-week audit across four or five different sites."

The rigorous process is designed to ensure that the company has all the correct management programs and controls in place. "First, the auditors read the documentation on our procedures, and our manuals," Riggs explains. "They look for evidence that we're following those procedures, and they audit our records for evidence

that we're doing what we say we're doing." Odyssey earned recertification in October 2016.

The Responsible Care program recently recognized ChemSolutions for outstanding performance. "I received the American Chemistry Council's partner company Employee of the Year award in 2016," Buelt says.

At PVS Distribution Group, the commitment to safety extends beyond the company's four walls, into its relationships with trading partners. "One challenge is educating our customer base, and sometimes suppliers, on how important safety is," Nicholson notes.

Sometimes a partner will

## Keeping a Close Eye on the Market

**B**ecause conditions that govern transportation pricing and capacity fluctuate constantly, chemical shippers and their logistics partners need to stay attentive to those ups and downs, says Mike Challman, vice president of North American Operations at CLX Logistics in Philadelphia.

Through its ChemLogix division, CLX helps chemical shippers with services such as freight procurement, intermodal transportation, international logistics, rail fleet management, and more. It also offers a multi-modal, cloud-based transportation management system (TMS). New services include several "virtual" dedicated fleets that CLX operates for some chemical shippers, where bulk carriers provide capacity, but committed to a specific customer for an extended time.

Among the trends that chemical shippers need to watch is the price of fuel, which is slowly rising. "Prices are still well below the peaks of a few years ago, but it seems the bottom has been reached and shippers can

expect steady increases to continue over the next few years," Challman predicts.

Freight rates are rising as well. "The pricing market was very favorable for shippers in recent years, but the pendulum is swinging back toward carriers now," Challman says. "Shippers need to keep a close eye on rates."

The driver shortage isn't as severe as some observers were predicting a few years ago, Challman says, but the aging of the driver pool could push some smaller carriers out of business. So might the federal rule requiring most motor carriers to install electronic logging devices (ELDs) on their trucks by December 2017. "While nearly all large carriers have already met the mandate, we are beginning to see some impact on small fleets and owner-operators who have not made the switch yet," Challman says.

Trucking companies and their customers could get some regulatory relief from the current presidential administration, which has been slowing the pace of regulatory

change, Challman says. "This trend is likely to continue, which may be generally positive but still contributes to some degree of uncertainty in the market—and uncertainty is generally not great for shippers," he notes.

Whatever the current trend, capacity will never be plentiful, Challman warns. "Shippers need to keep an eye on market conditions and look for opportunities to shift transportation modes—for example, switching from tank truck on road to ISO tank on rail," he says.

As CLX monitors those trends on behalf of customers, it is also taking steps to keep shippers' supply chains as efficient as possible in all market conditions. One recent initiative involves technology for monitoring loads. "We have been working with some shippers to install GPS tracking devices on company-owned bulk trailers," Challman explains. "This capability provides much improved real-time information about the location of both loaded and empty trailers, which is beneficial to both shippers and their customers."

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ask PVS to take an action the distributor doesn't consider safe, such as using an inappropriate fitting when delivering a product. "We have very strict rules here about what type of fittings we use, and what type of material construction is at the customer site for our chemicals—because different chemicals react with different types of metals, for example."

Before PVS makes its first delivery to a customer, it conducts a thorough assessment of the delivery site. "Sometimes those site assessments fail," Nicholson says. "A lot of our energy goes into educating customers and helping them achieve our safety standards so we can safely deliver."

New information technology helps to make those assessments more effective. "Site assessments used to be done with a piece of paper, today we can do them with an iPad," Nicholson says. "We take pictures and videos and get into the weeds on what a site looks like before we deliver there."

This is especially helpful in the eastern half of the United States, he says, where facilities often include tight spaces in older buildings.

Transplace is also committed to safety, establishing safety measures with its proactive tracking alerts triggered by status updates or EDI reason codes. The 3PL has also implemented a tracking portal that allows it to monitor hazmat shipments across all customers.

### Mastering the Data

Along with striving for maximum safety, companies that ship chemicals—like most shippers—continuously look for ways to make their supply chains more efficient. One strategy that's especially important in the chemical industry, according



**Rinchem's warehouses are designed for safe and efficient chemical storage and handling.**

to Buelt, is to improve the management of master data.

Master data is the information a company keeps about each of the products it handles. It includes specifications that are needed to complete a safety data sheet (SDS), which outlines the health and safety hazards the material might pose and explains how to handle the chemical safely. For bulk chemicals, master data might also include details about the kinds of pumps, hoses, trailers, and other equipment needed to pick it up and deliver it.

"If that information is missing and you need two or three phone calls to confirm, or you have old data, in the worst case you expose yourself to some risk if you show up to load or unload with improper equipment," says Buelt.

But even if the worst doesn't happen, incomplete or erroneous master data can waste a lot of time, as employees chase down the information they need to move a shipment.

Some chemical shippers have invested in sophisticated

information technology to help manage their master data, while others have not. ChemSolutions can lend support through C.H. Robinson's *Navisphere*, its proprietary transportation management system.

"One component of our master data management captures shipper requirements, hard codes them, and then puts in a change management system that determines, if requirements were to change, what steps we need to take to update our system," Buelt says.

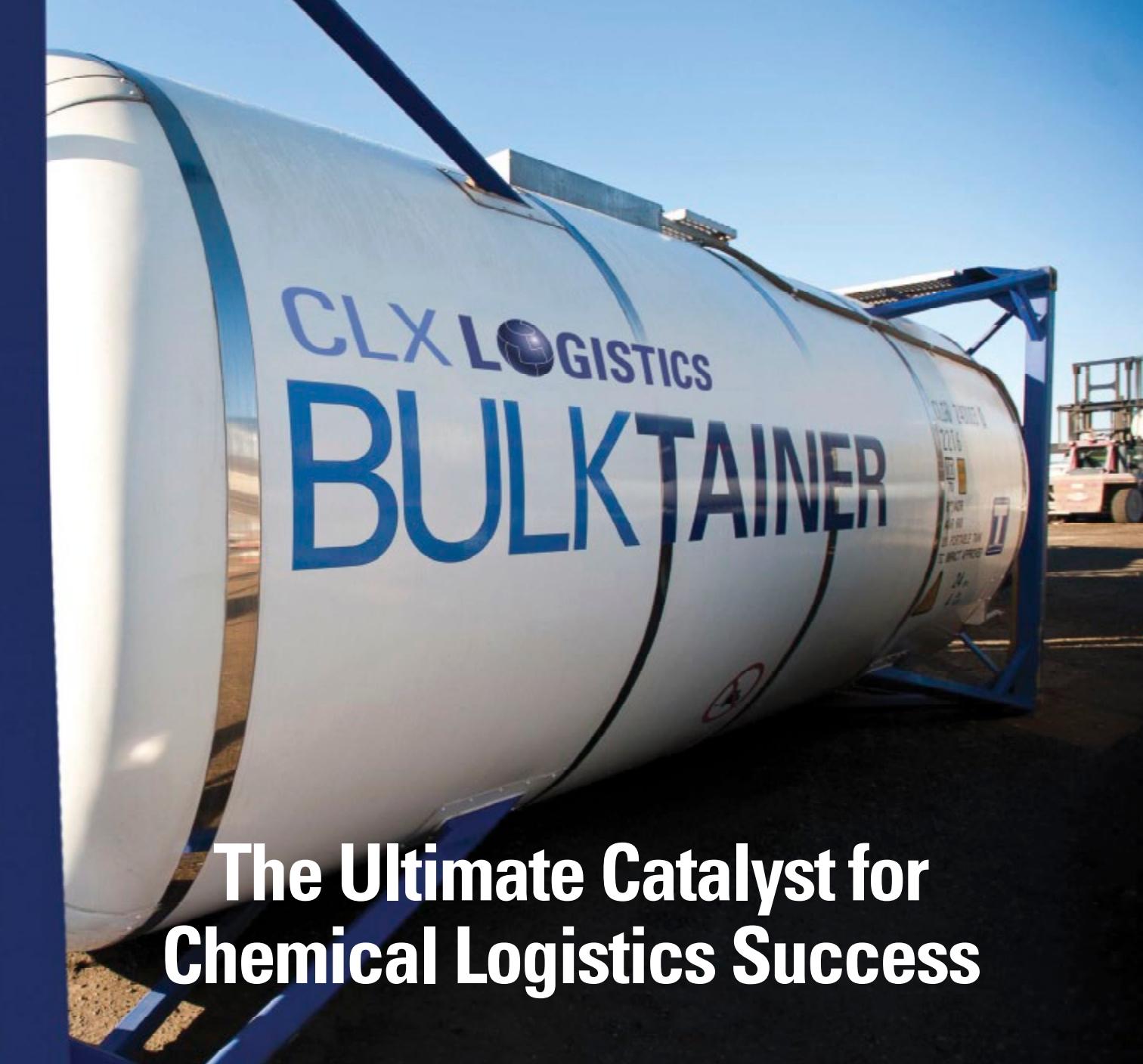
Transplace also has made several recent investments in information technology to provide better service to shippers. Some improvements include integrating and collaborating with real-time visibility solutions providers to enhance shipment track-and-trace capabilities on chemical shipments at any time, including high hazmat (poison inhalation hazard, chemical precursors) loads.

Transplace's business intelligence and data visualization tools enable customers to quickly see trends and shifts—and allows for a more informed decision-making process.

### Can You See Me Now?

Offering real-time visibility enhancements helps Transplace customers know precisely where their critical freight is at any moment in time. Proactive shipment lifecycle monitoring with automated cadenced status distribution to customers' organizations allows the 3PL to aggressively manage customers' service performance expectations on each in-motion shipment.

As demand for chemicals continues to grow, shippers will need to work hard on all fronts—to secure capacity, keep supply chains safe and secure, and to operate at optimal efficiency. ■



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