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Chemical Logistics

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Eastman Eases Into Global SC Strategy

Riding the Virtual Supply Chain Train

Coping With a Crisis

Chemicals See Sea Change

Ultimate Outsourcing

Chemical Logistics on the Web

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A JOINT SUPPLEMENT FROM

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All articles written by Gregory DL Morris

Chemical Supply Chain Comes of Age

Chemical shippers now view supply chain management as integral to success.

For years chemical supply chain managers have been trying to educate senior management that logistics is not just a line-item cost, but a vital part of the organization, as important as manufacturing and sales. Their mission is far from accomplished, but several recent developments show they are making progress.

First is the trend toward supply chain integration. Major chemical producers increasingly are integrating logistics into the highest levels of corporate planning. They are sharing proprietary systems to achieve greater connectivity with third-party logistics providers (3PLs), carriers, and customers.

In one recent example, Pilot Chemical, a surfactants and emulsions producer based in Cincinnati, closed its Santa Fe Springs, Calif., plant and consolidated manufacturing at its Midwest and East Coast facilities.

Rather than surrender its West Coast market, Pilot retained a 3PL – Ventura Transfer Company, based in Los Angeles – to handle transloading, storage, and distribution of bulk and packaged chemicals. Pilot's bulk liquids move through Ventura Transfer's Wilmington terminal, while packaged goods are handled at its Long Beach warehouse.

Pilot's move was a straightforward business decision to rationalize production. But for a small specialty-chemicals company to substitute distribution for manufacturing, and to do so at the end of a supply chain thousands of miles long, is a ringing endorsement of its supply chain managers, carriers, and distributors.

HEADING WEST: After consolidating manufacturing in the Midwest and on the East Coast, Pilot Chemical turned to Ventura Transfer Company to handle its transloading and other chemical distribution services on the West Coast.

There are better ways ahead.

He came up with this plan all on his own. He's thrilled to be a do-it-yourselfer, and he'll even get down the road a stretch under his own power. But who's looking out for him? What happens when he faces an uphill challenge?

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"We had to find out why we were the most expensive producer for our customers. We never considered freight because we assumed it was a fixed cost. But we discovered that there's more to freight than linehaul charges."

– Michael Rohrbaugh, supply chain manager, Pilot Chemical

The fact that the transition to outsourcing has been essentially seamless is even more noteworthy considering the lack of organization in Pilot's logistics management operations until recently.

"When I started at Pilot, supply chain was called purchasing," says Michael Rohrbaugh, the company's supply chain manager. "For the past three years, I concentrated on basic blocking and tackling. Our priorities were security and continuity of supply."

Those priorities were blown apart a few years ago by 85-mile-per-hour winds. "We found ourselves in single-supplier situations when hurricanes hit the Gulf Coast," says Rohrbaugh. "That was a bad place to be, so we have expanded our inbound supply chain. We now use one or two primary suppliers for most of our needs, and buy spot opportunities from discretionary suppliers. This approach not only gives us flexible supply, it also gives us outstanding market intelligence."

For outbound transportation, Rohrbaugh has prevailed upon Pilot's senior managers to take an introspective approach.

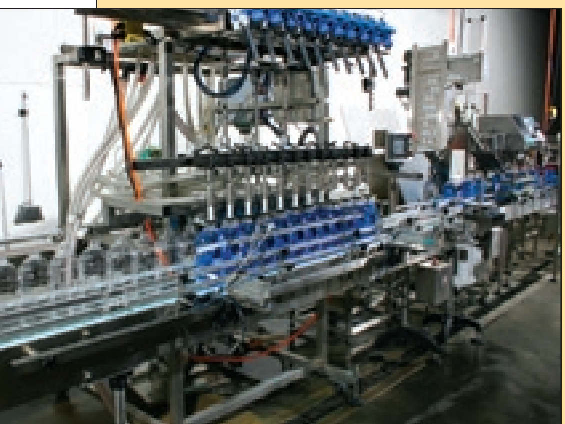
"We had to find out why we were the most expensive producer for our customers," he says. "We never considered freight because we assumed it was a fixed cost. Well, we discovered that freight was not a fixed cost, and that there is more to it than linehaul charges."

3PLs Move Up the Chain

Chemical logistics has organically evolved to the point where 3PLs are moving up the supply chain – practically to the reactor.

"We have been taking on more and more operations for chemical companies," affirms Doug Den Adel, chief operating officer of 3PL Jacobson Companies' warehouse division. Parent company Jacobson Inc., based in Des Moines, Iowa, includes trucking and logistics divisions. Each division operates independently, but can coordinate to meet shipper needs.

"We now provide packaging services, and fill drums and totes," says Den Adel. "But we also handle re-labeling, sampling, and even some contract manufacturing. We have engineers and chemists on staff."



Jacobson and other 3PLs increasingly perform value-added services, such as liquid fill, for chemical companies.

Jacobson's warehouse division includes 17 commercial chemical warehouses, plus an additional 12 facilities operated on-site or near a customer's plant.

In situations where the shipper owns the facility and Jacobson operates it, the service company charges a management fee and receives payment on actual throughput.

The 3PL has also developed an additional revenue stream in some of those cases. "If a shipper does not use all of the space in the facility, we market it," explains Den Adel. Jacobson and the facility owner split the revenue.

Jacobson is not yet a formal partner in Responsible Care, but is looking into adopting the codes. For now, the firm is thoroughly familiar with safety practices and follows them closely, according to Den Adel.

Starting From Scratch

Rohrbaugh started from scratch to measure transportation costs, which previously were only guessed at. He also retained a third-party logistics provider to help with metrics and implement more efficient processes.

"We tried to create a supply chain that is as hands-off as possible for both Pilot and our customers," says Rohrbaugh. "One result has been incredibly enhanced visibility."

Rohrbaugh, however, has not been able to change everything. For instance, the corporate structure still has traffic managers reporting to individual plant managers, rather than to him. He is also working on centralizing Pilot's transportation management software.

One advantage Rohrbaugh does have is that he can easily share best practices, thanks to the concentration of large chemical producers and national companies headquartered nearby. "Some big players in chemicals and logistics are located in Cincinnati, and we have talked to all of them," he says.

Pilot brings raw materials in by marine tank containers, bulk parcel tankers, barge, rail, and truck. Most

products are bought on a delivered basis.

Finished materials go out to customers primarily by truck, but the company uses some rail. About 60 percent of outbound shipments are sold on a delivered basis, but Pilot does accommodate 40 percent of sales ex-works.

Just as the number of suppliers was pared down, all plants now use only two or three core carriers. Truckers usually supply dedicated assets and drivers.

The Logic of Logistics

With the big Ventura venture now in place, Rohrbaugh is turning his attention to the next challenge: electronic integration with Pilot's third-party logistics provider. While the system is currently in place, back-up is handled manually.

"I would like to eliminate that safety net, which takes a huge amount of time," he says. "The more transactional tasks I can get off my plate, the more I can focus on core functions."

For instance, Rohrbaugh's goals for next year are to gain better control of inventory, improve velocity and order management, and do more forecasting and demand planning. "We need to conduct reality checks of our forecasts against actual sales, and get a better feel for safety stock levels," he says.

Even getting to this point has been a challenge for Rohrbaugh, managing both down and up the corporate ladder. "I have spent the better part of one year educating senior management about what is included in 'freight costs.' This education will continue to be a challenge, but we are making progress."

The work has also taken some courage because Rohrbaugh is arguing that detention charges and order changes – costs that had been charged to production – are, in fact, distribution costs. He is actually bringing costs into his operation, but only because he believes that they can be managed, reduced, and even eliminated. CL

Eastman Eases Into Global SC Strategy

Internal and outsourced IT systems, efficiency gains, and sustainability are the building blocks of Eastman Chemical's ambitious global supply chain initiative.

PUMPING UP: Eastman Chemical's facilities benefit from a supply chain improvement program that includes technology upgrades and enhanced railcar management and planning.

Eastman Chemical, Kingsport, Tenn., manufactures and markets chemicals, fibers, and plastics worldwide. In April, the company hired OM Partners, a global supply chain software integration and consulting company with U.S. offices in Atlanta, to provide logistics software and supply chain support as part of a broad, multi-year, strategic global supply chain initiative.

"We will implement an integrated planning tool that better enables us to create supply plans to meet dynamic demand patterns," explains Kevin Pruitt, Eastman's director of global chemicals and fibers supply chain. "We believe the integrated planning tool will provide the foundation for inventory optimization, which is another goal of our overall strategic initiative."

As part of its broader supply chain program, Eastman also developed in-house IT capabilities. "After researching available products and tools to improve railcar management, we decided to develop an internal system," says Pruitt. "This system has given us capabilities that were not available in products on the market.

"We are, however, dependent on the railroads to provide up-to-date fleet location information to enable effective utilization of our internal technology capabilities," he adds.

The impetus for the supply chain

development is aggressive business growth. But Eastman prefers to think of its supply chain improvements as reciprocal efforts as well as mutual challenges, considering that it is always difficult to balance flexibility with low cost.

"One objective of our supply chain is to enhance efficiency to support corporate growth initiatives without significantly increasing headcount," says Susan Armstrong, a supply chain associate at Eastman.

"These efficiency gains should provide the resources we need to support more volume and more customers," she adds. "The objective of our long-term supply chain strategy is to drive high performance. This initiative depends heavily on technology to enable productivity and service improvements."

"Our centralized supply chain is aligned with each of our businesses because we believe it is the responsibility of the supply chain to execute business strategies."

— **Susan Armstrong,** supply chain associate, Eastman Chemical

Gaining a Global Advantage

The service provided by Eastman's supply chain group gives the company a competitive advantage globally, according to Armstrong and Pruitt.

"Logistics is part of the service equation," says Armstrong. "Eastman's supply chain organization, including logistics, is centralized in Kingsport, with regional groups in Asia/Pacific, Latin America, and Europe. That centralized supply chain is aligned with each of Eastman's businesses because we believe it is the responsibility of the supply chain to execute business strategies."

She adds that Eastman's supply chain operates with common goals, metrics, and processes globally.

"With the objective to optimize our entire logistics network, we continuously evaluate options for 3PLs, distributors, and carriers who are an extension of our supply chain," says Armstrong. "We always try to balance our objectives to be efficient and effective. We want to be more productive internally while improving service options for customers."

Looking ahead, Pruitt sees several significant opportunities in supply chain management: supporting Eastman's aggressive growth strategies; managing rising fuel costs and constraints in the logistics infrastructure, specifically limited marine capacity when the volume of export shipments is increasing; supporting Eastman's commitment to Responsible Care, the chemical industry's safety initiative; and global compliance as a good corporate citizen.

"We are also focused on sustainability," adds Pruitt. "Manufacturing sustainable products is becoming more important to the chemical industry. We have developed a long-term strategy that will enable us to manage enviromental issues and improve our ability to contribute to Eastman's success." CL

Riding the Virtual Supply Chain Train

For chemical producers pulling into the integration station, Elemica holds the ticket.

The broadest integrated system among chemical producers is Elemica, a global network of manufacturers and distributors based around an electronic order processing and supply chain management system. When it started operations in 2001 in Wayne, Pa., with a large infusion of venture capital from participating firms, adoption was slow.

But business picked up during the past few years. Today, "we have resumed our growth," says Rick Bushnell, Elemica's vice president of global marketing and vice president of sales for North America. "Business this year is up quarter-over-quarter to date, and we are bringing more buyers and sellers to the network and adding more resources in North America and Europe."

"While we have experienced the largest growth from eastern Europe to South America to southeast Asia, the largest area of growth is local–working with terminals, warehouses, and distribution centers," adds Bill Harvey, logistics director for the Americas.

In addition to network growth, Elemica also sees an accelerating trend toward enlightened self-interest among shippers.

"With all the money chemical

producers are investing in their supply chains, they want truly integrated information technology among shippers, carriers, and consignees," Harvey notes. "As a result, producers are often willing to license or even share their proprietary systems."

BASF, the world's leading chemicals company with close to 100 large and a multitude of small production sites worldwide, is one example.

"About one year ago, BASF began to implement a new transportation management program that connects its system to its carriers' systems," says Harvey. "BASF brought Elemica into the program early. The initiative was unique because BASF did not start by determining what it needed from carriers. Instead, it asked what carriers needed from each shipping point. BASF, its carriers, and Elemica had a productive three-way conversation."

Eventually the initiative spread to include John Conley, president of National Tank Truck Carriers, as well as top executives at several large highway haulers such as Schneider National. BASF is rolling out the new program plant by plant.

Supply Chain Plugs In

At the manufacturing end, Elemica participant producers have focused on integrating the supply chain with terminal and warehouse operations, which includes managing replenishment and outbound shipments from production plants. Among Elemica partners, Dow, Celanese, and Rohm & Haas are leaders in this area, Bushnell says.

Elemica has formed a logistics advisory group to smooth the transfer and application of proprietary innovations to other shippers and carriers. "The idea is to have the early adopters lead the initiative toward standardization," Bushnell says. "We want to create a common solution."

"I am thrilled by the willingness of early adopters to help with standardization," Harvey notes. "This is true even among competitors. Elemica illustrates real sharing of best practices." CL

Coping With a Crisis

What do you do if your core rail carrier goes on strike? Chemical shippers learn the hard way.

Information sharing becomes crucial in a crisis, such as the strike against the Canadian National Railway (CN) that halted a large volume of movement on the railroad for most of February 2008. The strike was particularly vexing to chemical producers and to those producing dry bulk commodities such as inorganics or polymers, which depend heavily on rail transportation.

Chemical shippers and carriers learned a combination of preparation and acceptance from the CN strike. They got more notice than they would have for a flood, mud slide, or derailment, but with production and transportation already running flat out, there was little spare capacity for arranging alternate routes.

"First, the strike reinforced the need for chemical plants to be served by at least two railroads," says Marty Cove, manager of logistics for Vancouver-based Canexus Chemicals Canada, a major inorganics company and third-largest producer of sodium chlorate in the world.

Both the CN and the Canadian Pacific serve Canexus' Brandon, Manitoba, plant; and a short switch on the CN gives the company access to the two Class 1 railroads in the United States: the Union Pacific and the Burlington Northern Santa Fe. Management personnel were able to handle that switch during the strike, rendering Canexus luckier than some other shippers, acknowledges Cove, who operates a fleet of about 1,500 leased railcars.

"During the strike the soft issues – such as communications, carrier relations, and information systems – were extremely important," says Cove. "We took the strike seriously and were in constant communication with our sales team and customers. That created a lot of credibility with our customers."

Once the strike began, Cove and his team were also in contact with the railroads every day.

A STRIKING LESSON: Through preparation, communication, and strong carrier relationships, chemical shippers were able to keep their cargo moving during the CN strike in February 2008.

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"We received daily updates from our customers, and were able to make tactical decisions based on good information," Cove recalls. "Everyone was pulling in the same direction. Our customers, and even competitors, stepped up."

Competing producers in most chemical commodity markets are often willing to swap shipments when they can't meet delivery obligations. They do that knowing that the volume will be replaced as soon as possible, and that the favor will be returned when they experience an outage.

"During the strike, soft issues such as communications, carrier relations, and IT systems, were extremely important. They created credibility with our customers."

— **Marty Cove,** manager of logistics, Canexus Chemicals Canada

"We had producer swaps during the strike," says Cove. "But we also had customer swaps, which was unique. One customer, for example, was willing to release half a shipment of chlorate to a nearby competitor whose inventory was nearly depleted. Companies were not only worried about themselves."

Maintaining strong relationships with carriers was also essential to weathering the crisis. "We tried to stay out of CN's way," says Cove. "We made our preparations, and we knew that the sky was not falling. During the month of the strike, we only had to ask CN for a favor three times, and it was able to deliver all three times.

"We never shorted any of our customers," he adds. "We came perilously close, but it never happened." **CL**

Chemicals See Sea Change

A shift to 'hub complexes' casts the spotlight on deepsea logistics.

Supplying commodity chemicals has traditionally been a regional or local transaction. While global production centers such as Houston or Antwerp were always available, every major metropolitan area operated petrochemical plants so buyers could stay close to home.

That trend is changing as chemical producers shift operations to massive, integrated complexes to gain access to feedstocks and economies of scale. As a result, familiar over-the-fence or down-the-road sales have declined, thrusting logistics managers into the spotlight.

No commodity chemical illustrates this sea change more than methanol. This fundamental industrial alcohol is a building block for many plastics, solvents, and intermediate chemicals. Its most familiar application is windshield washer fluid. Natural gas is the raw material in a relatively simple process, so methanol plants have traditionally been small and numerous.

Demand for methanol has been growing strong for several years, especially in developing economies. At the same time, natural gas prices are rising. Total global methanol consumption reached 44.5 million tons

in 2007 and is forecast to reach 49.3 million tons this year, according to PCI-Ockerbloom & Co., a Kittery, Maine-based consultant to the global methanol and derivative markets.

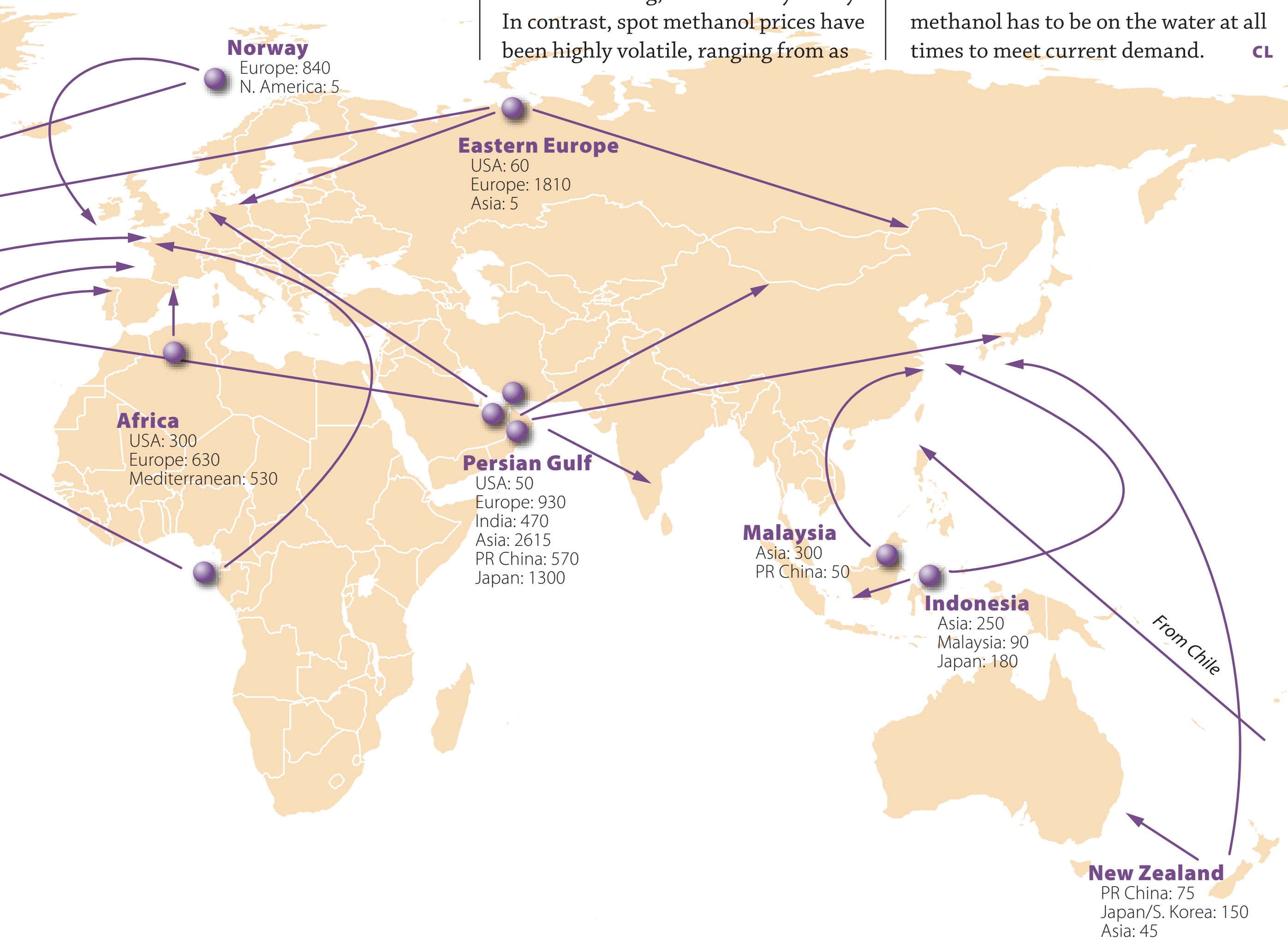
More importantly, global trade in methanol has risen from 42 percent of the market in 1986, to 50 percent in 1996, to 65 percent in 2006 (*see chart below*). That growth is a result of producers closing many smaller plants in North America and Europe, and concentrating production in hub centers in the Caribbean, South America, and the Middle East, close to high-volume, low-cost gas.

Deepsea tankers and tank terminals have become pivot points of global methanol trade. The largest methanol producer, Methanex, based in Vancouver, British Columbia, operates its own fleet of tankers trading under the name Waterfront Shipping. Methanex also has about one million dwt (deadweight tonnage) under charter, and makes extensive use of commercial terminal space. Its 100,000-ton dedicated tanker, the *Millennium Explorer*, makes shuttle runs from major production sites to large terminals. From there, parcel tankers deliver to customers, or customers can pick up using their own vessels or charters.

The challenge for supply chain managers is to spend capital budgets on transportation and storage – either build or charter – or to preserve capital but risk the spot market for both materials and shipping. Freight rates have been rising, but relatively slowly. In contrast, spot methanol prices have been highly volatile, ranging from as high as $3 per gallon f.o.b. (free on board) U.S. Gulf last year to $1.20 per gallon at the end of March. Contract buyers, by comparison, paid $1.90 per gallon in March and $1.60 per gallon in April.

And there lies the dichotomy: The new reality in supply chain management argues for long-term buying and contracts, but pricing trends argue for just-in-time spot purchases.

It gets even more complicated, given methanol's demand growth, particularly in China and India. For the first time in history, production can no longer match consumption on a direct basis. Production has to stay ahead of demand, given the realities of transportation distances and production upsets. Ockerbloom estimates that 1.3 million to 1.5 million tons of methanol has to be on the water at all times to meet current demand. **CL**



Source: Methanol & Derivatives Global Outlook 2000-2012
PCI – Ockerbloom & Company, Inc.

Ultimate Outsourcing

Acquiring Dow's caustic soda distribution business causes a chemical reaction at Univar.

The ultimate expression of outsourcing is when a shipper sells its distribution network to a service provider outright. One of the largest such transactions ever was completed early this year when Dow Canada sold its caustic soda distribution business to Univar Canada.

The transaction's value was not disclosed, but its scale is vast – as much as 280,000 dry metric tons of caustic soda, a key ingredient in a variety of industrial uses. The base of operations is a modern terminal in North Vancouver, British Columbia.

When Dow ceased chlor-alkali production at its vast petrochemical complex at Fort Saskatchewan, Alberta, the distribution business was no longer essential. But for Univar, gaining the business was a strategic move.

"Acquiring Dow's caustic soda distribution business cemented our position on the West Coast," says Barry Nicholls, vice president of marketing and strategic development for Univar Canada, based in Richmond, British Columbia. "Before the acquisition, we were present in the market, but not truly a player."

Univar first began importing liquid caustic soda from Asian producers to the West Coast – to its Long Beach, Calif., terminal – in 2000, and added terminals in Richmond, Calif., and Vancouver, Wash. The company also operates three deepsea terminals on the East Coast, six barge terminals up the Mississippi River system, and rail shipments from producers to Univar branches in all points of Canada and the United States.

"Univar is now the largest caustic soda distributor in both countries," says Sandy Wilson, product director for caustic soda with Univar USA, Seattle. "Relative to the overall market, however, we are still small, but growing."

On the inbound side, Univar inherited supply contracts from several Asian producers, some of which also supply its U.S. West Coast terminals. The company has no plans to make major changes when the deals come up for renewal, but is likely to consolidate U.S. and Canadian orders with each supplier to achieve better pricing. It will also seek to rationalize freight rates.

On the outbound side, Univar has barge, rail, and truck-loading capabilities at the North Vancouver terminal. The Dow acquisition included a fleet of 374 owned railcars, which Univar is keeping on its books. The company also maintains a smaller fleet of about 100 leased cars for U.S. distribution. Univar plans to operate the existing fleets with no changes. Even though there is quite a size difference, the fleets are appropriate to their geographical markets and average car cycle times.

Tapping Employee Expertise

Growth, rather than rationalization, was the driving strategy behind the acquisition of Dow's caustic soda distribution business. "Seven valuable employees at the terminal decided to stay on with us," says Nicholls, "and we are taking advantage of their expertise."

The only substantial consolidation may be among customers. "We have a lot of new caustic soda customers in Canada, but we already serve many of them for other products," he says.

Growth potential also exists at the North Van terminal, where the tanks Dow used to export ethylene dichloride reside. Univar could put the tanks into caustic-soda service, or use them to open the facility to handling a different commodity. Importantly, the tanks are clean and in good condition.

"Dow built a great facility with many advanced safety features," says Nicholls. "We have also been able to integrate Dow's safety procedures into our own."

That was made easier because both Dow and Univar are Responsible Care companies in Canada and the United States, so personnel operated under the same management practice codes. CL

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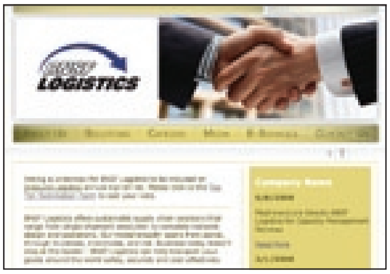
Check out these online resources to help you manage your chemical logistics challenges



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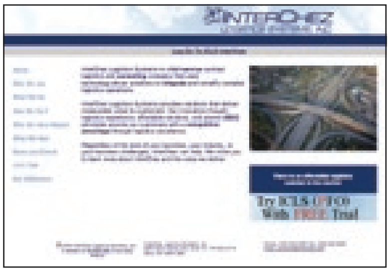

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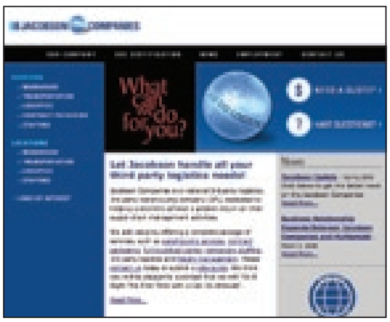

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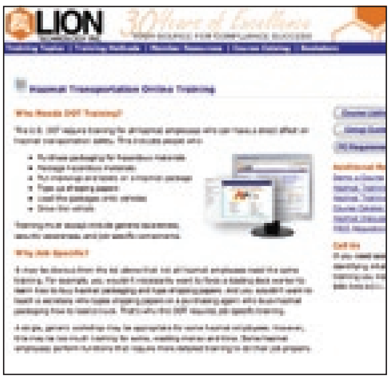

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