

Greater Houston Port Bureau

Port Bureau News

Quarter Four / 2025



Port Freeport 100th Anniversary

Also in this Issue: Captain's Corner | Port Watch | Evolving Tides: Maritime Security and Cybersecurity |
U.S. Blockade Has Left Venezuela Shadow Fleet in Limbo | 17th Annual Captains' Cup Golf Tournament
Beyond the Server Room: Why Data Centers Must Embrace Industrial-Grade Safety and Compliance |
In Emerging Economies, Shared Knowledge Is Key | Rice Business Scholarships | Port Bureau Fleet We

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Port Freeport ranks among the top ports in the nation, 10th in foreign waterborne export tonnage, 14th in total foreign waterborne tonnage, and 6th in chemicals, and is celebrating it's 100 Anniversary. Read more on page 24.



The Houston port region isn't just a hub for energy (petroleum, refined products, LNG) and chemicals/ petrochemicals, which dominated due to the region's industrial complex; it's a prime target in today's threat landscape, with known vulnerabilities to cyber intrusions and supply chain risks. See page 8.

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Publisher/President
CAPT Eric Carrero, USCG (Ret.)

Editor
Andrea LaVorgna

Copy Editor
Judith Schultz

Art Director
Andrea LaVorgna

Writers
Marco Ayala
CAPT Eric Carrero, USCG (Ret.)
John K. Carroll III

Katie Gilbert
Andrea LaVorgna
Tom Marian
Mark Sa
Judith Schultz

Data Visualization
Janette Molina

Photographers
Andrea LaVorgna

Port Bureau Staff
CAPT Eric Carrero, USCG (Ret.)

Tara Donnelly
Cristina Gomez
Angela Gonzalez
Andrea LaVorgna
Janette Molina
Corrina Ott
Judith Schultz
Tanya Scott

Port Bureau News
4400 Highway 225 E, #200
Deer Park, TX 77536
Phone: (713) 678-4300
Email: info@txgulf.org

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Captain's Corner

Port Region Advances in Infrastructure Investment, Efficiency in 2025

2025 was full of challenges but the Houston port region continued to demonstrate its strength, resilience, and growing national significance across commercial, energy, and passenger maritime sectors. The ports of Houston, Galveston, Texas City and Freeport played a critical role in supporting global trade, energy security, and regional economic growth. While cargo volumes experienced a modest decline, overall activity remained strong. We were able to advance our infrastructure investments, and the collaboration among port partners continued to enhance safety and operational efficiency across the Houston Ship Channel and surrounding waterways.



The completion of Project 11 on the Houston Ship Channel marked a significant milestone for the port region, delivering meaningful improvements to navigation safety and operational efficiency. As a direct result of the channel widening, from 530 ft to 700 ft, the pilots are now able to move most vessels without daylight restrictions,

allowing for greater flexibility in scheduling and improved vessel throughput. These enhancements reduce transit delays, support safer two-way traffic, and strengthen the channel's capacity to accommodate larger and more frequent vessel movements, reinforcing the Houston Ship Channel's role as a critical gateway for commerce and energy exports.

We also witnessed a major highlight in 2025 with the continued expansion of the cruise industry as the Port of Galveston once again delivered a record-setting year for cruise activity. They welcomed well over 1.78 million passengers, solidifying its position as one of the fastest-growing cruise homeports in the United States. Cruise operations generated significant economic impact for the region while supporting thousands of local jobs.



In 2025, the Port of Texas City reached an important milestone in its role as a critical energy hub, continuing to support strong volumes of crude oil and refined petroleum products moving through the region. The port's strategic location and infrastructure allowed it to play a key role in supporting refinery operations, energy exports, and supply chain reliability along the Upper Texas Coast. These activities reinforced Texas City's longstanding importance to the nation's energy sector while contributing to regional economic stability and maritime traffic efficiency.

As we reflect on 2025, I am proud to share that it was a year marked by meaningful progress, strong collaboration, and impactful advocacy for the Greater Houston Port Bureau and our port community. One of our most significant accomplishments was the successful passage of House Bill

2970, a critical legislative effort aimed at enhancing two-way vessel traffic safety and operational efficiency within the Houston Ship Channel. This achievement would not have been possible without the dedication of our Advocacy Committee, the support of our members, and the collaboration of our state leadership. HB 2970 represents a major step forward in improving navigational safety while supporting the continued growth and economic vitality of our ports.

In addition, our Dredging committee was key in working with the Army Corps of Engineer ("ACOE") for an improvement to the process for approving dredge material placement area ("DMPA") permits for our waterfront facilities. We had several meetings with senior ACOE leaders, to request a delegation of authority to the Galveston District for DMPA. By delegating authority from the Division level to District level, we estimate that facilities will save 4-6 weeks of the permitting process. As a result, project timelines will be shortened, operational disruptions minimized, and greater predictability achieved for private facility dredging activities. This improvement enhances efficiency across the port region, supports timely maintenance and expansion projects, and reflects the value of proactive collaboration between industry stakeholders and the Army Corps of Engineers in advancing safe and reliable maritime operations.

Beyond advocacy and dredging, 2025 was a year of strengthened engagement and connectivity. Through our Commerce Club luncheons, Maritime Dinner, committee meetings, and industry events, such as our Port 101, Port Bureau Connect and Women in Maritime/FOWIM, we continue to bring together over 5,000 maritime professionals, public officials, and stakeholders to foster dialogue and build relationships that advance our shared mission. Our social media footprint and Port Bureau News magazine continued to gain traction in 2025, generating more than 50,000 views and significantly expanding our reach and engagement across the port and maritime community. With the help of all of you, we'll continue to be the voice of the port region!

As we look ahead to 2026, we remain focused on promoting safe, efficient, and sustainable port operations while expanding opportunities for member engagement and industry leadership. We know advocacy and collaboration will remain key to sustaining this momentum. Thank you to our port partners, industry stakeholders, and public leaders for their continued support and commitment to keeping our waterways safe, efficient, and globally competitive. Let's continue to promote our ports and advocate for the infrastructure and policies that support long-term success.

Eric



#myportcommunityisbetterthanyours

CAPT Eric Carrero,
USCG (Ret.)
GHPB President



Port Watch

Governor of Fowl and Brute



Daniel Defoe’s publication of The Adventures of Robinson Crusoe in 1719 was greeted with great acclaim throughout England. His fictional tale of a castaway marooned on a deserted island for 28 years mesmerized the literate masses. Heretofore, writers such as Defoe were essayists that authored pamphlets on a wide range of political and social issues. Yet, the novelty of developing fictional characters through complex and challenging experiences via hundreds of pages was unheard of in the early eighteenth century. Its uniqueness was ... novel.

Then again, Defoe’s experiences were certainly novel. As a youth, he survived the great plague of 1665 that ravaged England and witnessed the 1666 inferno that destroyed 80% of London. His controversial political tracts landed him in prison on more than one occasion, and he was recruited as a spy by the Crown. Defoe was adept at captivating the reader with his journalistic recounting of historic events such as the hurricane of 1703 that devastated England and killed 8,000 people. Thus, in 1712, his curiosity was aroused when he read about a Scottish buccaneer -Alexander Selkirk - that had been a lone castaway on a South Pacific island 420 miles off the coast of Chile for over four years.



Selkirk had sailed from Kinsale, Ireland as the *Cinque Port*’s sailing master in September 1703. The 27-year old’s pugnacious temperament was well suited for sailing aboard a privateer to prey upon foreign merchant ships during the War of Spanish Succession. Yet, it did not endear him to his equally irascible captain. In September 1704, after several failed attempts to seize prizes and secure much needed supplies, Captain Stradling anchored his marginally seaworthy vessel off the coast of the uninhabited Más a Tierra Island. The weary and disgruntled crew were in dire need of fresh water and food and spent a month gathering sustenance and strength. Unfortunately, they did not tend to the worm-ravaged hull of the *Cinque Ports*. That did not sit well with Selkirk who sensed the crew was on the verge of mutiny.

Thus, when Stradling announced he was heaving anchor to continue their privateering ways along the South American coastline, Selkirk proclaimed he would rather remain on Más a Tierra than sail another league aboard the *Cinque Port* unless the ship was hauled ashore and repaired. Unfortunately for the stubborn Scotsman, no other crew members joined his protest, and Captain Stradling was more than keen to accommodate his request. To that end, Selkirk was given a Bible, musket, hatchet, knife, cooking pot, bedding and some clothes while a penitent Selkirk begged to not be left behind. His pleas ignored, the *Cinque Port* sailed beyond the horizon and, as Selkirk predicted, sank off the coast of Peru several months later.

Alone, the marooned sail master was convinced that another ship in need of food and water would rescue him in the coming months. As the months dragged into years, he was forced to relocate inland due to the thousands of mating elephant seals; was besieged by rats every evening; forced to chase down goats for food when his lead shot was exhausted; tamed feral cats to keep the rats at bay; evaded Spanish troops that he inadvertently contacted when they anchored off the island; and fashioned clothing from goat skins to keep the elements at bay. Finally, on February 2, 1709, Selkirk caught sight of a pair of vessels – the *Duke* and *Duchess* - flying the British colors anchored in the island’s bay. He hurriedly built a signal fire which prompted a landing party to come ashore.

Incredibly, the pilot of the *Duke* vouched for the “wild man” the ship’s landing party encountered since he had led a prior privateering expedition that included Selkirk. The crew were incredulous of Selkirk’s physical condition as he outraced man and dog alike to capture many a nimble goat for his rescuers. Selkirk was also instrumental in combating the crew’s scurvy and malnutrition as he provided them with wild herbs and vegetables from his island domain. In recognition of Selkirk’s skills and knowledge, the *Duke*’s captain addressed him as governor of the island and eventually appointed him as the vessel’s master.

Two percent fewer vessel masters called upon the Lone Star State’s ports in 2025. The annual decline for inland tows was even greater; December’s movements were below that of every month save February. Coincidentally, bluewater arrivals ended the year with nearly identical numbers as it began 2025.

The Port of Brownsville’s arrival tally crept up by three ships or 1% in 2025. Yet, there were some noticeable changes in the composition of those numbers. The largest component of Brownsville’s vessel types were bulkers which were down by 10%. On the other hand, the next most frequent caller – general cargo – was up 28%. It was the 17% rise in tanker calls that pushed the raw numbers into positive territory.

Texas City’s December arrival numbers posted a solid 14% gain in December with its 2nd highest arrivals for the year. Yet, the port ended 2025 14% “astern” of 2024’s arrival count. Mind you, there were a few bright spots with ocean going barges 57% ahead of the prior year’s numbers and the onset of LPG movements in December. Be that as it may, the port’s two largest vessel categories – chemical tankers and tankers – suffered substantial decreases of 21% and 16% respectively.

December was also kind to the Port of Galveston as its numbers were tied for the highest monthly count in 2025. Not surprisingly, this was attributable to the increase in the number of cruise lines operating on its waterfront. The final month of the year saw the greatest number of cruise ships, which were up 7% for the year. Conversely, the chemical tanker calls were off by 6% in 2025; however, tankers continued to arrive in the port on a more frequent basis – 23% to be precise. Ironically, Galveston’s overall arrival numbers lagged 2024 by 2% due to the 6% decrease in chemical tanker arrivals – the vast majority of which were lay berth arrivals. The bottom line is that Galveston is dominating the Gulf of America’s cruise ship business.

Freeport is certainly dominating the state’s ports with the highest percentage gain over the last quarter resulting in a 6% climb for the year. Container ships led the percentage gains at 29% and the port’s most frequent caller – chemical tankers – was up 12% this year. LPG, the next highest category, slipped a modest 1%; however, that was more than offset by the 16% uptick in LNG vessel arrivals.

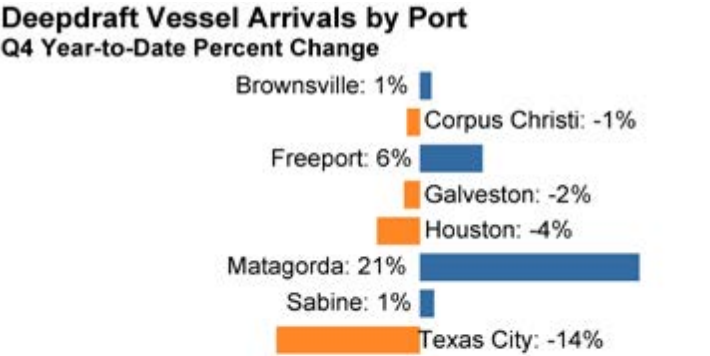
The opposite was true in the Sabine port region as 3% less LNG vessels plied its waterways in 2025, but 17% more LPG tankers arrived. Nonetheless, the port’s two largest vessel types – chemical tanker and tankers – fell over the last year 3% and 2% respectively. Fortunately, this wane was not enough to prevent the port from exceeding last year’s arrival statistics by 1%.

Corpus Christi also benefited from the robust demand of LNG. The final quarter for the year eclipsed all others, culminating in the highest number of LNG movements for the year in its final month. At year’s end, 15% more LNG vessels berthed at the port. Tankers and chemical tankers are the port’s bread and butter and while the latter equaled 2024’s count, the former waned by 2% resulting in an overall annual downtick of 1%.

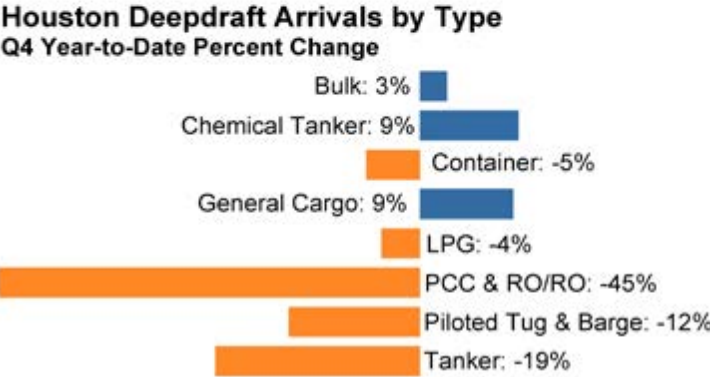
Houston’s 2025 wrap was not one for the record books unless one focuses on containers. The number of trucks transporting TEUs to and from the port’s two major container ports appears to know no bounds. The Ship Channel is certainly deeper and wider to accommodate the record number of containers – a record that is surpassed without fail on an annual basis. Alas, the roads that lead to those ports are beyond full. Regardless, a burgeoning regional population combined with the torrid demand for packaged petrochemical exports beckons growth and prosperity. The flow of general cargo and bulkers also reflects the region’s positive growth trajectory. General cargo arrivals rose 9% and bulkers logged a 3% gain in 2025.

There were some rather odd numbers in the final month of the year. Chemical tankers plummeted by 28% for the month but managed to out distance last year by 9%. Tankers also experienced a double-digit monthly leap of 22%. Sadly, this was too little too late as reflected in a 19% plummet for the year. Ocean going barges hit bottom in the same month with a precipitous drop of 27% culminating in a 12% year-over-year deficit.

Arguably, 350 fewer bluewater vessels (4% less) navigating the country’s busiest port signals that uncertainty looms on the horizon. Perhaps the



Source: Greater Houston Port Bureau’s Marine Exchange of Texas



Source: Greater Houston Port Bureau’s Marine Exchange of Texas

see-saw of the where and what of tariffs is creating trade friction or it could be the expectation that international trade is overdue for a contraction. Whatever is in the water, economics is not linear but the resumption of gains following setbacks is inevitable. Then again, the flow of containers and cruise ship calls across the Houston Ship Channel never seems to abate.

Nor did Selkirk’s desire for preying upon unarmed merchant ships. He resumed his buccaneering ways and finally returned to England in October 1711 – eight years after his departure from Ireland. His castaway adventure travelled quickly across the waterfront and was eventually published in 1712 spreading his story throughout Britian.

Unfortunately, it became increasingly difficult for Alexander Selkirk to remain away from sea. He yearned for the solitude he had found on his South Pacific isle prompting the former pirate to join the Royal Navy to – ironically- combat pirates. In November 1720 he set sail aboard HMS Weymouth as its first mate bound for the west coast of Africa. As a rule, the equatorial climes were not kind to sailors and the Weymouth’s crew was no exception as yellow fever spread below its decks. Throughout November and December 1721, sailors succumbed to the fever’s grip and were unceremoniously thrown overboard.

On December 13, 1721, Weymouth’s quartermaster entered into the ship’s log:
“North to northwest. Small Breeze and fair,”
“Took 3 Englishmen out of a Dutch ship and at 8 pm. Alexander Selkirk . . . died.”

The sea which spoke to his soul from his Island domain quietly swallowed the man whose ordeal gave birth to Robinson Crusoe.

*I am monarch of all I survey,
My right there is none to dispute;
From the center all around to the sea,
I am the lord of the fowl and the brute*

Tom Marian
Buffalo Marine Service
buffalomarine.com



Port Bureau's Annual Meeting & Commerce Club Luncheon February 12, at the Hyatt Regency Baytown featuring the Harris County Judge candidates.



Port Bureau Chairman Vincent DiCosimo, Senior Vice President-Government Affairs, Targa Resources, will lead a discussion with a panel of candidates for Harris County Judge.

- Panelists include:
- Dr. Letitia Plummer (D)-A native Houstonian, Dr. Letitia Plummer is a dentist by trade and served for an at-large Houston City Council Member for five years for Position 4 till December 2025, advocating for safer, stronger communities, fighting for working families and protecting public health.
 - Annise Parker (D)-Annise Parker served six years as Houston Mayor, after serving terms as an at-large Houston City Council member and city controller.
 - Aliza Dutt (R)-Aliza Dutt is a Chinese immigrant who came to the U.S. as a child. She previously worked as an energy analyst at IHS Energy and was elected mayor of Piney Point located just west of Houston in 2024.
 - Orlando Sanchez (R)-Orlando Sanchez immigrated to Houston as a child from Cuba, is a graduate of the University of Houston, and a veteran of the U.S. Air Force and the Texas Air National Guard. He served as Treasurer for Harris County for almost 12 years and as a Houston City Council member for 6 years.

- Marty Lancton (R)-Patrick “Marty” Lancton, a longtime firefighter and president of the Houston Fire Fighters Association, has spent over two decades serving the community in civic and charitable initiatives.
- Matt Salazar (D)-Matthew Salazar, originally from Lubbock and a graduate of University of Houston, has a background in the real estate business, operates a small nonprofit, the Farwell Foundation, that focuses on housing and job training for the homeless, and recently became owner of Forest Labs.
- George Zoes (R)-A native Houstonian, George Zoes is a leader that has built and managed businesses across the import/export, retail, medical, and service industries for 35 years.



Join or renew your membership today!
For details or to join, go to txgulf.org/membership-information

Founded in 1929, the Port Bureau is a non-profit trade organization dedicated to the success of the Houston Ship Channel with over 240 member companies. The Port Bureau promotes cooperation and collaboration to advance the port region for the benefit of all.

The Port Bureau members represent every sector of the maritime industry, from agents to admiralty lawyers, shippers to stevedores, and terminals to truckers. With four membership levels available, members can select the level best suited to their involvement in the maritime industry.

txgulf.org

Port Bureau Hosting VIP Fleet Week Event April 16

The Greater Houston Port Bureau will host a VIP event: Sailing Towards New Horizons in cooperation with Fleet Week Houston on April 16 at Manchester Terminal. The networking event will include duty U.S. Navy, Marine Corps, and Coast Guard, U.S. Army Corp of Engineers, Port Bureau members, organizations and media.

Set for April 15-22, Fleet Week Houston will mark the first time the U.S. Navy has brought this tradition to Texas, featuring three naval vessels and more than 1,000 sailors, Marines and Coast Guardsmen. The week long lineup includes ship tours, family-oriented activities, educational outreach, community service projects, business forums and lively celebrations.

“We are thrilled to bring Fleet Week to Houston for the very first time – Houstonians will get to know our Sailors, Marines, and Coast Guardsmen, hear their real stories, and see exactly what the sea services do every day to keep America safe and strong,” said Rear Adm. John W. Hewitt, Commander, Navy Region Southeast. “Houston has incredible energy as a dynamic city, and we’re excited to strengthen our military and community ties. A Network with fellow members, military officials, port executives, and professionals as you enjoy conversation, food, and drink at Manchester Terminal.

Sponsorships include digital and onsite marketing. For details and to register go to:
<https://www.txgulf.org/events/sailing-towards-new-horizons-fleet-week>



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Evolving Tides: Maritime Security and Cybersecurity in 2025 thru 2026



As someone who's spent decades knee-deep in industrial control systems and cybersecurity, starting way back with instrumentation and evolving into teaching International Society of Automation ("ISA") ISA/IEC 62443 OT security courses—I've seen how ports like Houston are the beating heart of global trade. The port of Houston handles massive cargo volumes each year, with public

terminals alone processing a record 53 million short tons in 2024 and showing strong 6% growth through late 2025, putting full-year figures on track to approach or exceed 56-57 million short tons. When factoring in the broader Houston Ship Channel ecosystem—including more than 200 private facilities—the total waterborne tonnage routinely surpasses 300 million short tons

annually, making it the nation's largest by far. This immense scale isn't just a hub for energy (petroleum, refined products, LNG) and chemicals/petrochemicals, which dominate due to the region's industrial complex; it's a prime target in today's threat landscape, with known vulnerabilities to cyber intrusions and supply chain risks. Through my work in InfraGard Houston, CG AMSC for the outer continental shelf, and on multiple advisory boards, I've had front-row seats to discussions on how we safeguard these vital assets. In 2025, maritime security isn't just about patrols or fences anymore; it's a tangled web of physical risks, cyber intrusions, hybrid attacks from nation-states, cybercriminals, and those sneaky advanced persistent threat groups ("APTs"). Let me break this down, drawing from what I've learned instructing folks on modern OT vulnerabilities, and blend in the latest from credible sources to paint a clear picture.

The Bigger Picture of Maritime Security Today

Predictive analytics, driven by AI, is reshaping how ports manage maritime security has always been about keeping the seas open and safe, but lately, it's gotten a lot more complicated. Take the United Nations Security Council debate back in August 2025—it zeroed in on prevention, innovation, and teaming up internationally to tackle emerging threats. I remember similar talks in my InfraGard and government circles, where we stress how global cooperation is key, especially for chokepoints like the Red Sea, South China Sea, and Panama Canal. A report from November 2025 highlighted ongoing tensions in the Panama Canal from drought and politics, plus beefed-up Chinese presence in the South China Sea, and even with ceasefires, the Red Sea's is still dicey. For Houston, where so much of our cargo ties into energy exports, any hiccup there hits home hard. Interestingly enough, I've advised on secure systems for chemical sectors that rely on these routes—disruptions aren't just delays; they can cascade into supply chain nightmares.

The U.S. bumped up maritime security in its 2025 National Security Strategy, putting a spotlight on free navigation and protecting those key passages. It's a smart move, especially with hybrid threats on the rise—think physical sabotage mixed with digital hacks. Taiwan's 2025 National Ocean Policy expanded to cover non-traditional stuff like cybersecurity, which mirrors what I've pushed in my trainings: you can't secure the seas without securing the systems running them. On the exercise front, NATO's MARSEC-25 in October 2025 worked on getting allies in sync, while SEACAT 2025 in Southeast Asia used tools like SeaVision to boost monitoring. From my perspective, these drills are crucial; I've trained National Guard units in Cyber Shield exercises, and it's the same principle—practice makes resilient.

Tech's changing the game too. The Inmarsat Future of Maritime Safety Report for 2025 dug into distress signals and vessel weak spots, showing how AI and satellites are spotting threats faster. But here's the rub: those same tools can be turned against us if not locked down properly. In my article "The Paradox of Security," I talked about how the most secure system is one that doesn't exist—over-reliance on tech without

safeguards is asking for trouble. (See 2024 Quarter 3 Port Bureau News, www.txgulf.org/news.)

Diving into Maritime Cybersecurity

Ports are going digital at breakneck speed globally—automated cranes, real-time tracking, you name it—and that's opened up a Pandora's box of cyber risks. An August 2025 piece from Help Net Security flagged rising issues like ransomware, malware, spying, and even jamming GNSS systems. The U.S. Coast Guard stepped up with a January 2025 rule requiring cyber plans, drills, and dedicated officers at facilities. They followed it with an April alert on foreign meddling in port gear and networks. As an ISA Fellow, I've been hammering home these points in classes: without solid incident response, a breach can shut down operations, just like NotPetya did to Maersk years ago.

NATO's CCDCOE brief this year pushed for tailored intel sharing in the sector, noting ports handle 80% of world trade but are wide open to cyber hits. ABS Consulting's early 2025 outlook pegged AI attacks and OT flaws as big worries. In Houston, where we deal with petrochemicals, these aren't abstract—I've consulted on systems where a cyber glitch could mean environmental disasters. But what keeps me up? It's how these digital threats bleed into physical ones. That said, it's worth noting that Houston's pilots, navigating in and out through Galveston Bay, lean heavily on skilled visual piloting rather than over-relying on tech. They use sight lines, ranges, and on-scene judgment for safe transits, with tools like AIS mandated as operational aids—not primaries—especially when managing restricted visibility (which may trigger suspensions or daylight-only requirements) or for widebody vessels often limited to daylight hours. This human expertise adds a layer of resilience against tech disruptions.

Nation-State Actors: The Heavy Hitters

Nation-states are the pros in this arena, often mixing cyber ops with real-world muscle. A CSIS report from October 2025 drew parallels to incidents like the Colonial Pipeline ransomware attack, showing how cybercriminals—often operating from safe havens in adversarial nations like those in the CRINK group (China, Russia, Iran, North Korea)—target critical infrastructure for economic disruption. Russia, China, Iran—they're the usual suspects. Russian crews have hammered Ukrainian ports, while China's blending cyber snooping with South China Sea maneuvers.

The 2022 Nord Stream blast was a wake-up call on hybrid attacks against underwater infrastructure—attribution's tough, responses even tougher. AWS noted in 2025 that state actors are now peeking into ship CCTV and more. For us in Houston, foreign tech in our ports could leak cargo intel straight to adversaries. NATO's July 2025 warning on European port hacks exposed those gaps. And don't get me started on geopolitics—pro-Palestinian hacktivists using AIS data to harass Israeli ships? That's activism crossing into state-like ops, and it could spill over to our allies. In my time in my work and volunteer roles, I've seen how these actors probe for weaknesses. It's not just about stealing data; it's disrupting flows to gain leverage.

Aspect	Advanced Persistent Threats (APTs)	Cybercriminals
Primary Motivation	Espionage, sabotage, or strategic disruption (often state-sponsored or aligned with nation-states like China or Russia)	Financial gain through extortion, theft, or quick-hit scams
Targets in Maritime	Critical infrastructure (e.g., vessel OT systems, port IT/OT systems, supply chains, navigation tech) for long-term access and geopolitical leverage	High-value operations (e.g., shipping companies, logistics firms) for ransomware payouts or data resale
Methods	Stealthy, long-term infiltration (e.g., supply chain compromises, zero-days, custom malware like APT41's tools)	Opportunistic attacks (e.g., phishing, known vulnerabilities, off-the-shelf ransomware)
Persistence & Sophistication	High: Multi-stage campaigns lasting months/years; evades detection (e.g., SideWinder's credential theft in shipping)	Medium: Hit-and-run style; less evasion focus unless in safe havens like CRINK nations
Examples from 2025	APT41 targeting global shipping for intel; Russian-linked groups disrupting Ukrainian ports	Ransomware breaches causing downtime in transport (e.g., Asimily-reported incidents)
Impact on Vessels & Ports	Potential for hybrid physical-cyber attacks (e.g., GNSS jamming leading to navigation errors)	Operational shutdowns and financial losses (e.g., similar to NotPetya on Maersk)
Defenses Needed	Advanced threat hunting, intel sharing (e.g., via OT-ISAC), zero-trust models	Basic hygiene, backups, rapid response plans (e.g., USCG-mandated drills)

Table One: Seven Aspects, APTs, Cybercriminals – 2025- Ayala

Cybercriminals and APTs: The Opportunists and Sneaks

Then there are the cybercriminals and APTs, chasing cash or secrets. Ransomware's exploding in 2025—ABS Consulting reported big breaches in transport causing shutdowns and lost bucks. The International Chamber of Shipping's 2024/2025 barometer ranked cyber as a top peril. See Table One.

APTs like SideWinder or China's APT41 are ramping up against shipping, slipping in via malware or supply chains. Cyble's July 2025 dive counted at least a dozen APTs hitting the industry amid tensions. They're after creds, certs, data—often paving the way for ransomware. Hacktivists pile on, messing with ports for causes. In Houston's OT-heavy world, one breach in petrochemical controls? Boom—safety nightmare.

From my InfraGard work, I know these groups evolve fast; staying ahead means constant vigilance.

What's Happened in 2025 and How We're Fighting Back

This year's seen a jump in attacks—Industrial Cyber noted hacktivists and states ramping up, including GPS tricks. And just this month, French authorities nabbed a Latvian crew member for planting malware—a remote access tool—on the Italian ferry *Fantastic* (owned by Italian shipping company Grandi Navi Veloci) while it was docked in Sète. The tool could've let outsiders remotely control the ship, but thankfully, the company spotted it, neutralized the threat without any real damage, and tipped off the cops. The guy was charged with hacking on behalf of a foreign power, with suspicions pointing toward Russian interference, as French Interior Minister Laurent Nuñez called it a "very serious matter" involving foreign meddling. A Bulgarian crewmate was questioned but let go. This kind of insider threat hits close to home for me—I've drilled teams on spotting these in OT environments, and it shows how even passenger vessels aren't immune, blending cyber-risks with potential physical sabotage.

Globally, the Cyprus-Israel-Greece summit in December 2025 pledged a Maritime Cybersecurity Center. In India, IIT Kanpur's training and the new Bureau of Port Security focus on risks and sharing intel.

USCG's Cyber Protection Teams are hunting state actors, and insurers are demanding better coverage. ABS Consulting's 2025 take stressed endpoint security for offshore rigs. Closer to home, through InfraGard Houston and National, we've been pushing similar defenses.

Looking Ahead: 2026 Outlook

As we wrapped up 2025, I'm already thinking about what's next—from my vantage point advising on port futures and training teams, the threats aren't letting up; if anything, they're getting sharper and more targeted. Windward's 2026 Maritime Forecast paints a picture of ongoing instability, with global trade routes caught in geopolitical tugs-of-war, like persistent Red Sea disruptions and Russia's expanding "dark fleet" using spoofed AIS and shady transfers to dodge sanctions. What worries me is the blend of cyber and physical—think undersea cable sabotage or AI-fueled data leaks from blurred enterprise-consumer tools, making maritime ops even riskier.

In transportation, the NMFTA's 2026 Trends Report warns of a surge in cyber-enabled cargo theft, where AI amps up social engineering for fake bills of lading or deepfake calls, compressing breaches to under an hour. Ransomware will evolve beyond encryption to pure extortion, hitting supply chains hard, while OT-IT gaps invite hybrid attacks on telematics and smart systems. Experts predict nation-states and criminals will ramp up on critical infrastructure like ports and logistics, using GPS jamming and one-day exploits for cyberphysical chaos. It's not all doom; with

IMO's updated guidelines kicking in and regs like CIRCIA demanding quick reporting, we'll see more automated defenses and collaborations. But honestly, from my sessions, the key will be treating cyber as a full-spectrum issue—more targeted yes, but with the right prep, we can stay one step ahead.

Steering Toward Safer Waters

For the Greater Houston Port Bureau and folks like us, tackling this means a well-rounded strategy: pump money into AI monitoring, build those public-private ties, and stick to regs like the USCG's. Training's huge—I've seen it transform teams in my ISA sessions. But honestly, while threats keep morphing, our defenses can too. By leaning on innovation and staying alert, Houston can keep its edge in trade, even in rough waters.

Marco Ayala, ISA Fellow
President, InfraGard Houston Members Alliance
InfraGard National Sector Chief – Energy,
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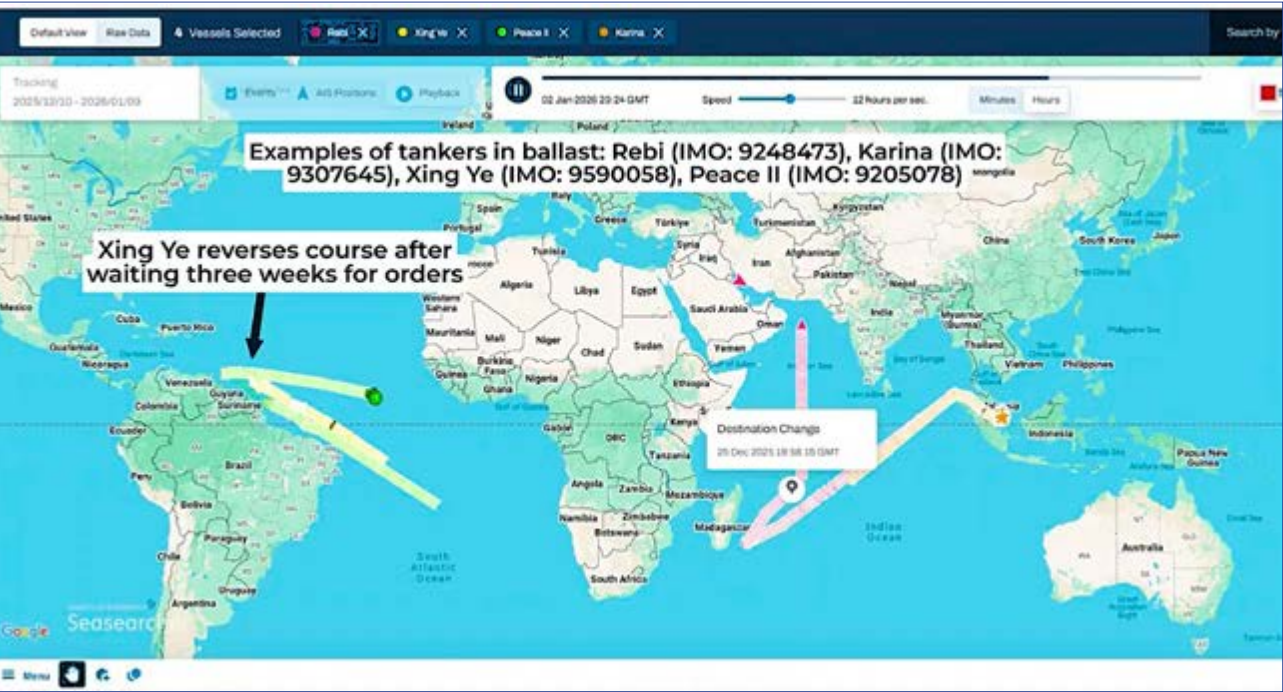
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US Blockade Has Left Venezuela Shadow Fleet in Limbo



- AtleastthreeVenezuelashadowfleetshipshavealready pivoted to Iran or Russia trades
- US action against Venezuela has sparked a rash of tanker U-turns and satellite spoofing, but many have stopped awaiting orders
- China continues to accept Venezuelan crude from tankers already on the water

Lloyd’s List analysis of Venezuela shadow fleet sees some ships re-routing, some starting to spoof location and several undeterred by the U.S. blockade, but many wait in limbo.

The shadow fleet serving Venezuela’s sanctioned oil exports has been thrown into disarray following the U.S. blockade and the capture of Nicolás Maduro, with vessels scattered across the globe in various states of limbo — some waiting, some rerouting and others disappearing from tracking systems altogether.

A Lloyd’s List analysis of approximately 50 tankers that were laden with Venezuelan oil or en route to lift cargo as the U.S. imposed a maritime blockade reveals a fleet caught between conflicting pressures: the tightening U.S. enforcement campaign and persistent Chinese demand for discounted crude.

Vessel-tracking data, of those that are traceable via AIS (there are certainly others whose location and status is unknown) from Lloyd’s List Intelligence paints a picture of uncertainty.

Of the vessels tracked that were inbound to Venezuela when the crisis erupted in mid-December, at least six are now drifting or waiting at sea, their operators apparently unsure whether to proceed.

Seven others have pivoted to find alternative employment, with at least two redirecting to service Iranian or Russian oil trades instead.

The Aframax *Rebi* (IMO: 9248473) offers a clear example of fleet redeployment.

The sanctioned tanker executed a U-turn while heading toward Venezuela and sailed directly for the Middle East Gulf, where it has now arrived.

The ship started manipulating its Automatic Identification System data shortly thereafter. It is common for tankers lifting Iranian crude to spoof their positional information to show them operating in the Gulf or off Iraq while they load sanctioned barrels.

Another vessel, the *Karina* (IMO: 9307645), similarly abandoned its Venezuela-bound voyage, making its way to Malaysia’s offshore anchorage where it began spoofing its position — likely pivoting to support Russian or Iranian oil transshipment operations.

Meanwhile, *Xing Ye* (IMO: 9590058) offers a glimpse of the indecision gripping the fleet.

The VLCC was heading toward Venezuela in ballast when it began drifting on December 19, waiting for nearly three weeks before reversing course on January 8.

Satellite imagery from January 5 confirmed the vessel’s position and that the AIS data had not been falsified.

Xing Ye appears to have abandoned its voyage for the time being, but has yet to pursue a new port of call.

It is one of six tankers that appear to be waiting for orders.

The situation is equally fragmented for those already laden with Venezuelan crude and heading for delivery.

While 11 tankers appear to be continuing their voyages east toward China at normal speed, there are seven vessels that are either paused off the Chinese coast, waiting to berth, or waiting in Malaysian waters.

The VLCC *Tina 5* (IMO: 9237761), laden with Venezuelan crude loaded before the crisis, arrived near Zhoushan on December 20 and has remained at anchor ever since, waiting for nearly three weeks with no indication of when it might discharge.

It is not clear if it is the situation on the ground that is causing the delays to unloading operations, though other deliveries in the months prior faced similar waiting times.

Three others have executed apparent U-turns. *Seasilk* (IMO: 9315147) reversed course in the South China Sea and retreated to Malaysia’s offshore anchorage after initially signalling Yantai as its destination.

White Crane (IMO: 9323429), another laden tanker, appeared poised to deliver its cargo when it executed the beginnings of a U-turn on December 11 after it was designated by the U.S. Office of Foreign Assets Control. It remained anchored in open waters between Vietnam and the Riau Islands. At the end of December it sailed into Malaysia waters, where it has lingered since. Its Venezuelan crude is apparently still onboard.

It is difficult to be certain that *White Crane*’s voyage was not falsified during the period it was at anchor. However, the vessel changed its destination from Dalian, China, to “for order” and its draught information has yet to be updated.

These are both manual inputs, and only further data to contextualise *White Crane*’s movements will confirm if the U-turn is genuine.

Meanwhile *Tamia* (IMO: 9315642) appears to be back on course after a series of back-and-forth manoeuvres.

The tanker was sailing east towards the Cape of Good Hope when it abruptly reversed course on December 12, the day after being targeted under the same sanctions package as *White Crane*.

It sailed for the Gulf of Guinea, where it sat at anchor for several days at the start of January before resuming its voyage.

The mid-voyage reversals have raised questions about whether U.S. enforcement actions are deterring Chinese importers from accepting Venezuelan crude. But market sources suggest the picture is more nuanced.

A trader at a key Chinese private refiner told Lloyd’s List that buyers have no concerns about accepting cargoes already on the water. “Vessels can still dock at Chinese ports without problems,” he said.

If Venezuelan supplies were to be cut off in the future, the trader added, teapot refineries would look first to Russian and Iranian crude as alternatives — attracted by comparable discounts and familiar supply chain arrangements.

Yet the physical movement of oil tells only part of the story.

An industry expert offered an alternative explanation for the mid-voyage disruptions: a pricing standoff between traders and Chinese teapot refineries, the ultimate buyers of most Venezuelan crude.

The sudden escalation in Venezuela has driven a wedge between the two sides, the trader said. Traders, anticipating that reduced supply will push prices higher, are seeking to renegotiate terms upward.

Teapot refineries, meanwhile, are well stocked and see no urgency to pay a premium — preferring instead to wait and see how events unfold.

“Some deliveries may have been cancelled, with traders opting to hold inventory for now,” the source said.

Adding to the confusion is the Trump administration’s announcement that it intends to seize 30m-50m barrels of sanctioned Venezuelan crude and release it onto the global market. But the lack of detail has left market participants guessing.

Key questions remain unanswered: how long will it take to restart exports under Washington’s control? How much of the oil will be absorbed by the U.S. domestically? And crucially, will sales to China be permitted, and at what price?

“Prices for Venezuelan crude in China have been rising every day since Maduro’s capture, but there have been very few actual transactions,” the industry source said. “This shows that buyers and sellers are still in a standoff.”

Despite the disruptions, some vessels have continued their voyages without apparent hindrance. At least five tankers completed deliveries to China post-crisis with their AIS operating normally — suggesting that for some, the enforcement pressure has yet to bite.

Yong Le (IMO: 9623257) is currently discharging its cargo in China, while *Alma* (IMO: 9321304) delivered between December 17 and 20; both cargoes loaded before the crisis escalated.

Several vessels have resorted to deceptive shipping practices to obscure their movements.

At least six laden tankers are employing AIS spoofing or have disabled their transponders entirely to disguise their deliveries to the end buyer.

It is not uncommon for tankers that engage in this trade to operate on the shadowy side of things, but it is a notable shift for the tankers that previously transmitted openly during the final leg of their journeys, which suggests heightened caution amid the enforcement crackdown.

Mark Sa
Vice President of Growth
Lloyd's List Intelligence
Mark.Sa@lloydslistintelligence.com





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The 17th Annual Captain's Cup Golf Tournament



Shamrock Marine's Team Wins the Captain's Cup Golf Tournament
Team: CAPT Bill Diehl, Tim Studdert, Dee Hunt, and Jarrett Phillips

Sunny skies greeted golfers on the greens at Sugar Creek Country Club for the Port Bureau's 17th Annual Captain's Cup Golf Tournament on Nov. 2.

The team from Shamrock Marine - Bill Diehl (former Port Bureau president!), Dee Hunt, Jarrett Phillips, and Tim Studdert - took home the first place gross honors. Second place gross went to Doug Dorton, Greg Harner, Oliver Jones, and Kevin Pearce from the Callan Marine team.

Additional team wins went to:

First place net: Schröder Marine Services team - Simon Christensen, Karl Schröder, Garrett Steward, and Paul Madsen.

Second place net: Moran Shipping Agencies team - Rob LeClair, Ryan Lee, Jason Spalding, and Jesse Villareal.

Third place net: Arc Marine team - Paul Ayala, Grant Leal, Andrew Medellin, and Chris Puig.



The friendly competition was high, with players vying for the top spot in several contests. Winners were Bryan Johnston, Closest to Pin # 4 Robert; Christy Finken, Closest to Pin #6 Robert; John Lankford,

Closest to Pin #6 Jones; and Tim Kopfensteiner for Longest Drive #8 Jones. Golfers also scored wins in the Chipping Contest and the very popular Putting Contest.

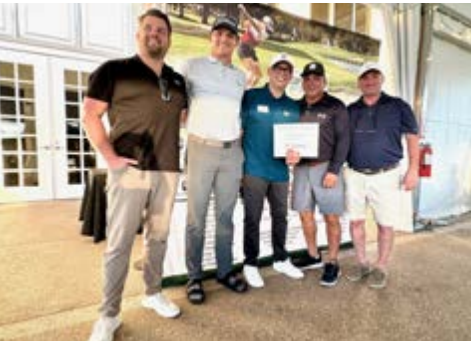
In addition to breakfast, lunch, and dinner, hospitality tents dotted the course, offering beverages, snacks, and giveaways. A raffle, along with a dinner and awards ceremony at the outdoor patio at Sugar Creek topped off day's celebrations.

The Port Bureau appreciates all our golfers, volunteers and sponsors! In addition to our generous sponsors, we would also like to thank the Golf Committee for their hard work: Tim Studdert, chair (Shamrock Marine), Jamie Sylvester, co-chair (Crowe, LLP), Royce Clutter (Suderman & Young Towing Co.), Christy Finken (Bank of Texas), Michael Grant (Imperial), Matthew Kuroski (Wells Fargo), Gavin Osorno (AccuTRANS), Crissy Rivera (Texas Capital Bank), Richard Rojas (Stellar Bank), Karl Schröder (Schröder Marine Services), Frank Yonish (Fifth Third Bank).

Save the Date! The 2026 Captain's Cup tournament is slated for Nov. 2. The event sells out quickly each year. If you or your company is interested in participating, please email to golf-info@txgulf.org to receive updates.



2nd Gross - Callan Marine team - Doug Dorton, Greg Harner, Oliver Jones, and Kevin Pearce



2nd Net - Moran Shipping Agencies team - Rob LeClair, Ryan Lee, Jason Spalding, and Jesse Villareal



1st Net - Schröder Marine Services team - Simon Christensen, Karl Schröder, Garrett Steward, and Paul Madsen



3rd Net - Arc Marine team - Paul Ayala, Grant Leal, Andrew Medellin, and Chris Puig



Team Wins

First place gross:

Buffalo Marine - CAPT Bill Diehl, Tim Studdert, Dee Hunt, and Jarrett Phillips

Second place gross:

Callan Marine - Doug Dorton, Greg Harner, Oliver Jones, and Kevin Pearce

First place net:

Schröder Marine Services - Simon Christensen, Karl Schröder, Garrett Steward, and Paul Madsen

Second place net:

Moran Shipping Agencies - Rob LeClair, Ryan Lee, Jason Spalding, and Jesse Villareal

Third place net:

Arc Marine - Paul Ayala, Grant Leal, Andrew Medellin, and Chris Puig

Beyond the Server Room: Why Data Centers Must Embrace Industrial-Grade Safety and Compliance



Photo: New Albany Data Center in Central Ohio.

As the global demand for digital infrastructure accelerates—driven by artificial intelligence ("AI"), cloud computing, and global connectivity—the data center industry finds itself at a crossroads as it is outpacing the ability of utilities, regulators, and zones to keep up. Growth is explosive, technology is evolving, and the stakes have never been higher. Still, amid this progress, one truth remains: no matter how advanced the systems are, resilience depends on people, preparation, and compliance. The shift toward AI-scale data centers is reshaping the industrial landscape. While these facilities may not be typical industrial facilities like refineries, marine terminals, or oil depots, they share many of the same environmental, safety, and regulatory challenges.

The laws and lessons that have guided the energy sector for decades are more relevant now than ever. When we talk about data center readiness, most think of cybersecurity, backup power, and network redundancy. Yet some of the most significant risks are not digital—they're physical and environmental. A data center houses thousands of servers, complex electrical systems, and large-scale mechanical infrastructure. Backup generators store vast amounts of diesel fuel, and cooling systems manage millions of gallons of water. Each of these components introduces potential risks: fire, spills, leaks, or environmental contamination. In the energy, oil and gas, and chemical industries, these risks are managed through decades of regulation and routine drills. Data centers must adopt a similar mindset.

This article provides a high-level overview of many of the regulations and considerations this emerging sector must address as growth continues. While not every item applies to all situations and not every requirement is covered here, it provides insight into how these operations must manage risks similar to those long managed by the established energy sector. Operations, technology, and assets may evolve rapidly, but the foundational laws and regulatory expectations of our country remain constant.

Overview of Core Compliance Concerns

The industrial world has long operated under the strict oversight of environmental laws like the Clean Air Act ("CAA"), Clean Water Act ("CWA"), and the Oil Pollution Act of 1990 ("OPA90"). Increasingly, these same guidelines are beginning to apply to data centers.

Air Permitting: As data centers scale to meet AI demand, these same frameworks are beginning to apply. Backup generators—the lifeline of uptime—are also major sources of emissions. Whether your facility operates ten or a hundred units, you may trigger federal and state air permitting requirements under the CAA. Key programs include New Source Review ("NSR") Permits, Title V Operating Permits, and NESHAP/RICE Rules (National Emission Standards for Hazardous Air

Pollutants ("NESHAP") for Reciprocating Internal Combustion Engines ("RICE"), which govern emissions and maintenance. Permitting timelines can delay construction, if not planned early. Engage with regulators during design, not after the first concrete pour. Air permits in particular can be very long processes before approvals are granted.

Water Permitting: AI data centers are water-intensive operations. Cooling towers, chillers, and process systems can trigger multiple layers of CWA permitting from water withdrawal and stormwater management to discharges under NPDES (National Pollutant Discharge Elimination System) regulations. Common missteps include underestimating cooling water withdrawal limits, stormwater construction and operational permits, wastewater discharge requirements, and local water use restrictions. Delays in water permitting can stall commissioning and invite costly retrofits. Proactive engagement and clear documentation are key to keeping projects on schedule.

SPCC Compliance: Under the CWA, facilities storing 1,320 gallons or more of oil or diesel must maintain a Spill Prevention, Control, and Countermeasure ("SPCC") Plan. For data centers, this typically covers diesel tanks for backup generators, oil-filled operational equipment such as transformers and switchgear, and lubricants and hydraulic systems. SPCC compliance isn't optional or after-the-fact. Plans must be developed by a qualified professional, reviewed regularly, and integrated into facility training and operations. A single overlooked valve or missing containment measure can lead to fines, shutdowns, or environmental damage.

Security: Physical security compliance is a critical component of data center resilience. Facilities should adhere to applicable Department of Homeland Security ("DHS") guidance, implement robust access control, video surveillance, and visitor management programs, and maintain secure perimeters with audited entry points aligned to NIST (National Institute of Standards and Technology) 800-53 PE (Physical-and-Environmental-Protection) controls. Emergency procedures, including evacuation and shelter-in-place drills, must be tested regularly to ensure staff readiness and rapid, coordinated response during incidents.

Health and Safety: Beyond environmental and security, companies must maintain compliance with OSHA (Occupational Safety and Health Administration) 29 CFR Part 1910 for general industry safety, conduct fire suppression system testing in accordance with NFPA (National Fire Protection Association) 75 and 76, implement programs for addressing heat exposure, noise control, and ergonomic risks, and provide annual EHS (Environment, Health & Safety) training along with thorough incident documentation.

Other Regulatory Considerations: Lastly, companies must monitor energy efficiency and, in many cases, manage hazardous materials and refrigerants in compliance with EPA (Environmental Protection Agency) Section 608. They should maintain thorough documentation for state-level environmental permits and sustainability reporting and address any potential waste generation in accordance with RCRA (Resource Conservation and Recovery Act) requirements.

Drills and Exercises: Routine exercises should extend well beyond fire alarms, cyberattacks, and technology failures. Regular drills should also include disaster recovery scenarios, environmental and safety drills,

and operational readiness testing. These exercises empower teams, refine procedures, and expose small but critical gaps—like mislabeled valves, misplaced spill kits, generic or flawed response plans/operating procedures, or communication breakdowns. These small details often determine the difference between a controlled incident and a major emergency.

In oil and gas, routine drills, documented plans, and strict permitting are ingrained by decades of regulation and culture. Data centers, by contrast, are a younger industry built on speed, efficiency, and innovation. As the physical footprint grows, however, the operational and environmental risks mirror those of traditional heavy industry.

Innovation Meets Responsibility

The challenge is clear—how do we retain the agility of a tech enterprise while adopting the rigor of an industrial operator? Every facility, whether a hyperscale AI hub or an edge deployment, must view itself not just as a digital node, but as a complex, high-energy industrial operation. The same diligence that keeps refineries safe must apply to generator yards, chiller plants, and electrical rooms. As this sector expands, we cannot afford to separate innovation from responsibility. Conduct real-world drills, integrate environmental permitting into design timelines, maintain active SPCC, air, and water compliance plans and programs, and share lessons learned across the industry.

Preparedness isn't built during a crisis—it's built before one. Data centers may not be refineries or marine terminals, but they are now part of the same essential infrastructure ecosystem. With that comes the same duty: to protect people, the environment, and the continuity of the systems that power modern life.

It is imperative that, as this sector continues to grow, owners and operators establish programs that reflect the rigor of long-standing industrial compliance systems. These programs should ensure robust recordkeeping, training, preparedness, and operational oversight—extending well beyond cybersecurity and IT concerns. By doing so, organizations can mitigate compliance risks, safeguard personnel, protect the environment, and prevent costly incidents before they occur.

John K. Carroll III
Managing Director – Compliance Services
Witt O'Brien's
jcarroll@wittobriens.com



John K. Carroll III, Managing Director – Compliance Services, Witt O'Brien's, part of Ambipar, is an environmental and emergency preparedness professional specializing in compliance and risk management for critical infrastructure, including data centers, energy, and industrial facilities.

In Emerging Economies, Shared Knowledge Is Key

In nascent markets, breakthrough products like clean cookstoves can save lives. But lasting impact does not come from donations. It comes from the “knowledge intermediaries” that build a market infrastructure to get these products into homes.



Photo courtesy of Rice University.

Key Findings:

- Markets may need to be built from the ground up in countries that lack the markets for distributing certain life-saving products.
- Building markets to distribute these products is likely a more scalable and sustainable approach to improving public welfare than dropping them into a community for free.
- Many scholars think of governments and multinational corporations as the main actors behind market-building. But they're overlooking an important third actor behind this work: the “knowledge intermediary.”

More than two billion people around the world cook their meals over indoor heat sources that fill their homes with toxic smoke. The health consequences are severe. The World Health Organization estimates that roughly three million people die each year from illnesses linked to household air pollution caused by open fires and stoves fueled by kerosene, wood, crop waste or coal.

Many of these deaths are preventable. For decades, cleaner alternatives have existed that dramatically reduce harmful emissions while meeting the everyday demands of cooking. Among them are clean cookstoves — technologies designed to burn fuel more efficiently and with far fewer health risks.

Yet clean cookstoves remain far from universal. Like many proven technologies aimed at improving public health, they face obstacles that go beyond engineering. How do you introduce a life-saving tool in ways that respect local cooking practices? How do you scale adoption without relying indefinitely on donor funding?

In theory, markets are meant to solve problems like this by connecting supply and demand. In practice, they often break down when the benefits are long-term, diffuse, or hardest to capture by the people who bear the upfront costs. So what happens when the need for clean cookstoves is clear, but the market to deliver them barely exists?

When Products Exist but Markets Don't

Who creates such markets, and how? In a new paper published in *Organization Science*, Rice Business assistant professor of management Diana Jue-Rajasingh looks beyond the usual suspects — governments and multinational corporations — to study a critical market-building role: the underappreciated, multifaceted actor she calls the “knowledge intermediary.”

“There are critical players doing work in this space that are not companies or governments,” Jue-Rajasingh says. “This opens the door to a third sector.”

In the clean cookstoves space, for example, the main knowledge intermediary is the Clean Cooking Alliance (“CCA”). (Coincidentally, the CEO of CCA is a Rice Business alum.) The CCA is housed within the United Nations but represents a broad coalition of public and private collaborators, including U.S. government agencies, nonprofits like the Shell Foundation and private companies.

Although building knowledge for a new market is costly and complex, Jue-Rajasingh’s findings show why investing in it is essential.

She contrasts the “knowledge-push” model of market-building with the more common “charity-push” approach, where products are simply given away in low-income communities. She argues that the knowledge-based strategy is more likely to produce scalable, sustainable results over the long term.

“The charity-push ignores what people actually want,” Jue-Rajasingh said. “It overlooks the need to build local capacity — whether through businesses, entrepreneurs or supportive policies and norms. You can hand out products, but if nothing is changing on the ground, the impact may be minimal.”

The Overlooked Role of Knowledge Intermediaries

Making a market, especially in poor and remote communities, is a complicated and expensive process with complementary components for both supply and demand.

On the demand side, education is key: Potential customers need to know that an improved product exists and that it's relevant to them. They also need to know how to correctly use and maintain it. Sometimes financing tools are also part of the equation, to ensure new products are affordable for their target audiences.

On the supply side, distribution networks need to operate dependably to get the products to people who need them. Often, building a new market also calls for government actors to step in, either by taxing certain products differently, helping to promote specific solutions or exempting key product parts from tariffs.

All of this collaborative, educational, market-making work falls under the purview of the knowledge intermediary.

Jue-Rajasingh explains that the effort unfolds in two stages. The first involves a first-order knowledge intermediary — in this case, the CCA — helping launch high-level industry development in a small group of countries (for the CCA, these include Bangladesh, China, Ghana, Guatemala, India, Kenya, Nigeria and Uganda). At this stage, the intermediary acts as a central hub: gathering and sharing information, brokering partnerships for pilot projects and learning opportunities, and providing resources such as technical assistance, business training, financing and more.

In the second stage, a different set of organizations move to the fore: those that have worked with the main knowledge intermediary in its countries of focus during stage one. Now, those many organizations become second-order knowledge intermediaries, bringing their new market-building knowledge further afield. These second-order knowledge intermediaries are typically existing companies and nonprofits.

If a first-order knowledge intermediary like the Clean Cooking Alliance represents the hub of a wheel, second-order knowledge intermediaries are the spokes — transmitting knowledge and market capacity into new places.

Hubs and Spokes

To trace the ripple effects of the efforts made by first- and second-order knowledge intermediaries, Jue-Rajasingh conducted interviews and drew archival data from the various second-order organizations that were active in the CCA’s primary countries and beyond. She also leveraged a dataset derived from a CCA partner directory, which comprised 2,371 organizations operating across 113 countries between 2013 and 2019.

The data revealed that, indeed, second-order knowledge intermediaries that connected to the central hub of the CCA did appear to spur more entrepreneurial activity in the countries where they operated, outside of CCA’s geographical focus.

While she had suspected that second-order knowledge intermediary organizations were helping to spread market-building knowledge, she says she was struck by the level of activity she observed: “In the secondary countries, these organizations weren't just trying to sell products — they were working with other organizations to build a market infrastructure,” she says.

Of course, focusing only on market mechanisms to disseminate social solutions can be taken to an extreme, Jue-Rajasingh notes. The approach can overlook people who have very constrained financial resources, for example. Also, countries with a healthy mix of companies and nonprofits were more likely to build strong markets for clean cookstoves.

“There were some kinds of knowledge and capabilities that companies could take up, and others that nonprofits could,” Jue-Rajasingh explains. “If a country has only nonprofits and no companies, it won't generate the full range of activity and momentum the industry needs — and the same is true in reverse.”

Katie Gilbert
Contributing Writer

Rice Business
katie.elizabeth.gilbert@gmail.com



The 2026 Port of the Future Conference™



The 2026 Port of the Future Conference “2 Days, 50 Ports,” returns on March 24-25, 2026, to the Hilton University Houston. Now in its seventh year, the event continues to bring an array of visionaries, researchers, and thought leaders to present the latest concepts and cutting-edge technologies in the ports and maritime sector. In each of the last three years, the event has hosted representatives from more than sixty ports worldwide.

In its short history, the Port of the Future Conference has earned a stellar reputation, addressing the most urgent and pressing issues facing ports of entry, regulators, and associated industries. It offers an information-

packed agenda, hosting prominent leaders in the port and maritime industry to discuss new concepts and best practices, projected trends and emerging challenges, and promising research and innovations in the port and maritime industry.

The conference’s coverage of issues and advances in the ports and the maritime industry is impressive. This year’s conference is organized in nine tracks, covering the areas of: Increasing Port Operational Efficiency, Enhancing America’s Maritime Security; Developing Ports; Intermodal Connectivity; Decarbonization and Alternate Fuels; Port Energy and Sustainability; Port Infrastructure 4.0 (consisting of advances in Artificial Intelligence; automation, robotics, digitalization and information sharing); Port Security, Cybersecurity and Emergency Management, and Advances in Dredging Technology and Techniques.

This year’s program is highlighted by an impressive slate of guest speakers. Keynote speakers include MG Jason Kelly, Deputy Commanding General, U.S. Army Corps of Engineers; RADM James Watson, USCG (retired) and co-author of “Zero Point Four: How U.S. Leadership in Maritime Will Secure America’s Future.”

Prominent international speakers are led by Capitán de Altura Manuel Gutierrez Gallardo, Coordinator General of Ports and Merchant Marine of Mexico and Darwin Telemaque, President, the Port Management Association of the Caribbean. Dan Yuska of the U.S. Maritime Administration (MARAD) and David Walker, Vice President of ABS will return to highlight advances by MARAD’s U.S. Center for Maritime Innovation.

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Apply by February 28, 2026



The Greater Houston Port Bureau will award two scholarships to our membership for professional leadership development at Rice Business Executive Education’s Leading Organizational Change for April 21-23, 2026. The program is designed and taught by Dr. Scott Sonenshein. Each scholarship for Leading Organizational Change is valued at \$4,875. and includes full tuition, class materials, meals, and refreshments.

In this program, you will gain the actionable skills and strategies needed to lead transformative organizational change with confidence. Learn how to influence and inspire change across all levels—whether in entire organizations, departments, business units, or teams. Through a hands-on, action-based learning approach, you will dive into real-world case studies, review cutting-edge research, and apply innovative solutions that drive lasting impact. From reshaping strategies and optimizing operations to navigating cultural shifts and integrating new technologies, you will be empowered to lead change that delivers measurable results. Unlock your full potential and become the catalyst for meaningful transformation in your organization.

Program takeaways:

- Lead change across strategy, cost-cutting, culture, operations and technology with confidence.
- Design and execute change initiatives that drive real, measurable impact.
- Turn resistance into momentum, motivate teams and thrive despite resource constraints.
- Build resilience and agility to navigate disruption and uncertainty.
- Assess your leadership strengths and uncover new opportunities for growth.

The program is led by Scott Sonenshein, Ph.D., Henry Gardiner Symonds Professor of Management at Rice University and New York Times Bestselling Author.

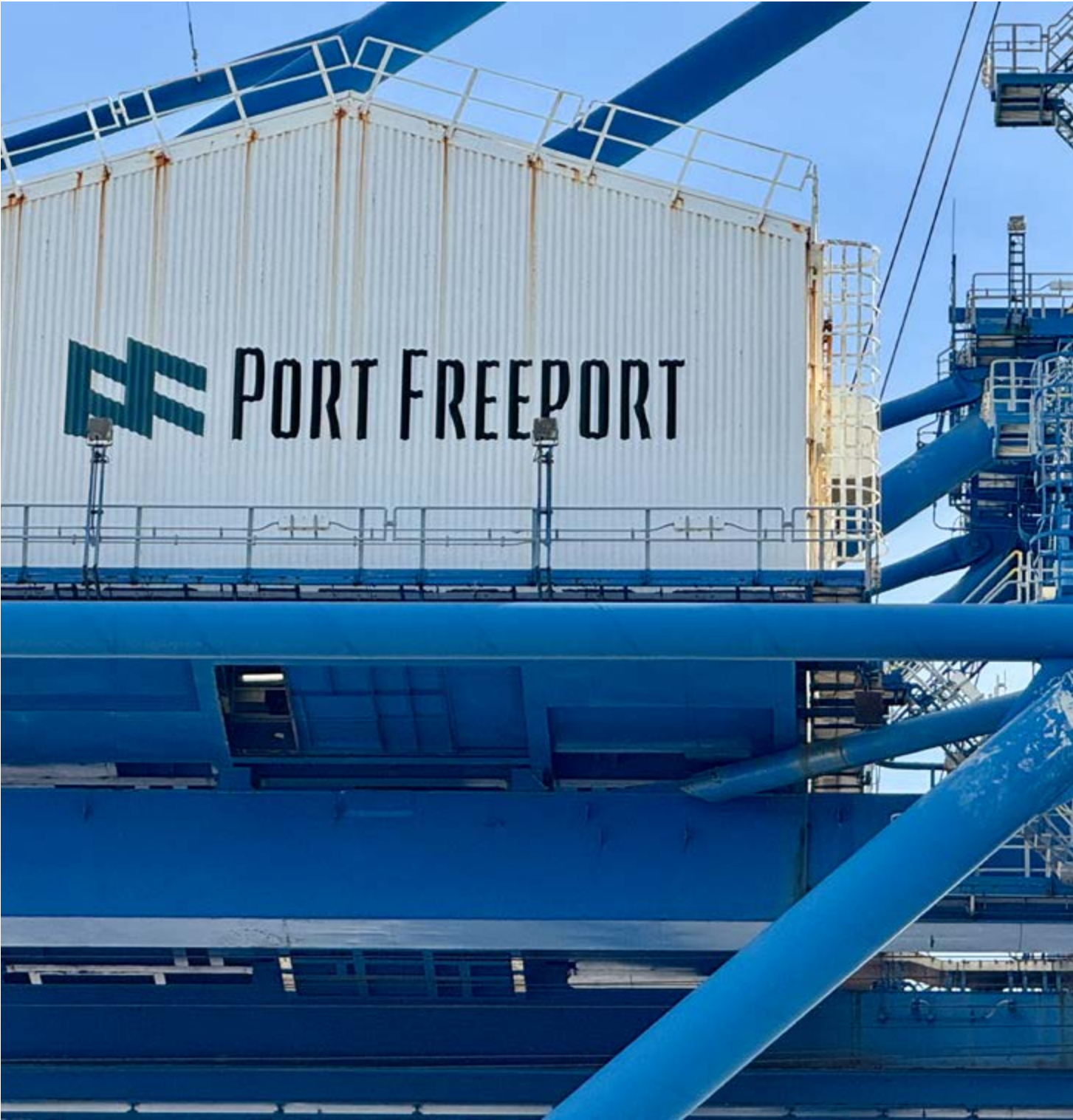
Professionals employed by Port Bureau member companies can apply or nominate a candidate from their company. Program participants should be C-suite executives, senior leaders, HR professionals, mid-level managers, finance leaders in their company who drive enterprise-wide transformation and implement change. For more on the program visit: <https://business.rice.edu/executive-education/open-enrollment-programs/leading-organizational-change>.

Port Bureau members will receive an email announcing the opening of the application. All applications or nominations must be received by the Port Bureau by **February 28, 2026**. Scholarship awards will be announced on March 12, 2026. For more information and to apply, go to: <https://www.txgulf.org/ghpb-scholarship>.

Executive professional scholarships have been generously underwritten by Rice Business Executive Education, Rice University. For more information and details about Rice Business Executive Education programs, contact Zoran Perunovic at Zoran.Perunovic@rice.edu.



Port Freeport at 100: A Century of Vision, Resilience, and Global Impact



In 2025, Port Freeport proudly marked its centennial year, celebrating 100 years of maritime leadership, economic growth, and service to Texas, the nation, and global trade. What began in 1925 as the Brazos River Harbor Navigation District of Brazoria County has evolved into one of the most significant and dynamic ports in the United States.

The vision for a deepwater port along the Brazos River dates back even further. In the early 1820s, Stephen F. Austin, widely known as the “Father of Texas,” recognized the river’s strategic potential and selected the area for his colony. For decades, the region served as a vital export hub for cotton, oil, and sulfur, despite persistent challenges from flooding and severe storms. Early settlers and community leaders demonstrated resilience and ingenuity, laying the groundwork for a sustainable port that could support long-term economic vitality.

That vision became reality in the 1920s. Following recommendations from the U.S. Army Corps of Engineers to divert the Brazos River, the Brazoria County Commissioners Court petitioned for an election on September 14, 1925. Voters approved the creation of the Brazos River Harbor Navigation District and a \$1 million tax-supported bond issue on December 4, 1925. Just ten days later, on December 14, 1925, the County Commissioners signed the order officially establishing the District and appointing its first commissioners, marking the formal beginning of what is now Port Freeport.



The completion of the Brazos River Diversion Channel on September 13, 1929, proved transformative. It allowed the District to dredge the old River Harbor Channel, opening the door to federal funding for dredging and maintenance and enabling the Port to become economically viable. By 1936, the first public dock facilities were completed, setting the stage for industrial expansion.

A pivotal moment came in 1940, when The Dow Chemical Company purchased 640 acres along the River Harbor Channel to construct Dow Plant A. This investment brought new prosperity to the region and helped establish one of the largest chemical complexes in the world, connected

to global markets through the Port. During World War II, the Government Defense Corporation constructed an aviation gasoline refinery and marine loading facilities in the area, which were later acquired by Phillips 66, further solidifying the Port’s role in energy and industrial exports.



Over the decades, Port Freeport has attracted a diverse roster of global industry leaders, including BASF, Freeport LNG, Enterprise Products Partners, Riviana Foods, Inc., Chiquita Fresh N.A., Dole Fresh Fruit, Fresh Del Monte Produce Inc., Tenaris, AMPORTS, and Volkswagen Group of America. Together, these partners have helped shape Port Freeport into a strategic gateway for international commerce.



Today, Port Freeport ranks among the top ports in the nation, 10th in foreign waterborne export tonnage, 14th in total foreign waterborne tonnage, and 6th in chemicals, while standing as one of the largest petrochemical and energy ports in the United States. In 2007, the Brazos River Harbor Navigation District officially adopted the name Port Freeport with the passage of House Bill 542, reflecting its modern identity and expanding global role.

The Port’s growth has been driven by sustained investment in infrastructure. Over the past century, Port Freeport has developed more than 2,500 linear feet of general cargo berths and 1,725 linear feet of container berths at the Velasco Container Terminal, supported by 90

acres of container storage, more than seven miles of rail infrastructure, over 200 acres dedicated to vehicle processing, and extensive access improvements designed to ensure global competitiveness.

A defining chapter of the Port's modern era is the Freeport Harbor Channel Improvement Project. Approved by voters on May 5, 2018, through a \$130 million bond package to fund the non-federal share of the \$295 million project, the initiative includes partial widening and deepening of the channel to depths ranging from 51 to 56 feet. In February 2020, the U.S. Army Corps of Engineers provided the required new start designation and initial federal funding, officially launching construction. Set for completion in 2026, the project will make Port Freeport the deepest port in Texas and further strengthen its position in global maritime commerce.



Port Freeport's impact extends far beyond the waterfront. The Port generates an annual economic impact of \$157.3 billion and supports more than 266,000 jobs nationwide, underscoring its vital role in creating opportunity and prosperity for communities, businesses, and families across Texas and the United States.

In another historic milestone, the Port Freeport Commission voted on September 12, 2024, to adopt a zero-tax rate. For the first time in its history, Port Freeport will operate as a fully self-reliant entity without a tax assessment, reflecting strong financial stewardship and long-term sustainability.

As it celebrates its centennial, Port Freeport stands as a testament to vision, perseverance, and partnership—from the early recognition of the Brazos River's promise to the bold decision to divert the river, and from the construction of its first docks to the development of world-class infrastructure that serves global markets today. Honored by the Texas House of Representatives and Senate, Port Freeport enters its next century committed to innovation, environmental stewardship, community development, and continued excellence in maritime commerce.

Phyllis Saathoff
CEO
Port Freeport



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CongratulationstoPortBureauMembersoftheMonth



October

Ariana Almaguer is a Senior Vice President of Commercial Banking at Amegy Bank.

Ariana currently serves on the Board of Directors for the Greater Houston Port Bureau and is actively engaged in committees supporting our members.

AmegyBank



November

Darren Shelton is Director of Sales at Moran Shipping Agencies, Inc.

Daren has over 30 years of experience in the maritime industry. As a provider of shipping agency and advisory services, he has served as Chair of the Lone Star Harbor Safety Committee and leads the Galveston – Texas City Lone Star Subcommittee. He is also an active member of the Port Bureau's Efficiency

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With offices throughout Texas, our attorneys have handled eminent domain proceedings from one end of the state to the other. We advise and represent clients and industry coalitions at the Texas Legislature regarding proposed eminent domain legislation and before state and federal regulatory agencies. Additionally, we frequently speak on podcasts and at conferences and publish authoritative papers regarding the latest developments in eminent domain and land use law.



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September 2025 Commerce Club Featuring Nicole Rodriguez, Commander, Sector Houston-Galveston, U.S. Coast Guard

Rodriguez Discusses Coast Guard’s Role in Maritime Governance



The Port Bureau welcomed Captain Nicole D. Rodriguez, Commander, Sector Houston-Galveston, U.S. Coast Guard (“Coast Guard”), as the featured speaker at the September Commerce Club luncheon.

Sector Houston-Galveston areas of responsibility extend from Freeport, Texas, to Lake Charles, La., and is comprised of over 1,500 active duty, civilian, and reserve personnel. This area encompasses five of the 20 busiest ports in the nation as well as 247 miles of Gulf Intracoastal Waterway.

“Today I’m going to be speaking to you a little bit about the Coast Guard’s role in maritime governance ... and, I’d ask you to focus as we face new and evolving threats to the global maritime system,” said Rodriguez.

Rodriguez briefly discussed the history of the Coast Guard’s military service, ultimately describing it as “a law enforcement agency, a government regulatory agency, and a first responder all rolled into one.” Maritime governance, said Rodriguez, is a “shared space” – the “collaborative space where federal, state, and local authorities meet along with industry to make sure U.S. waterways, ports, and harbors are safe, secure, and environmentally sound.” She also stressed the importance of this collaboration. “This port is a critical port ... We are the energy provider of the world in this port.”

“But here,” Rodriguez continued, “we, your Coast Guard, work with our federal, local, and state partners. We also work with all of you in this room – and, all of you in this room work with other federal, state, and local partners and work together every day to execute our search and rescue mission, our security mission, to manage our vessel traffic, ensure environmental protection, and to ensure that commerce can exist and bloom in that shared space.”

“And I can tell you – and tell everybody – I am the luckiest ‘Captain of the Port’ in the world because there is no better place than Houston and the Houston region for partnerships!”

Rodriguez urged attendees to think about how to move forward in the “shared space.”

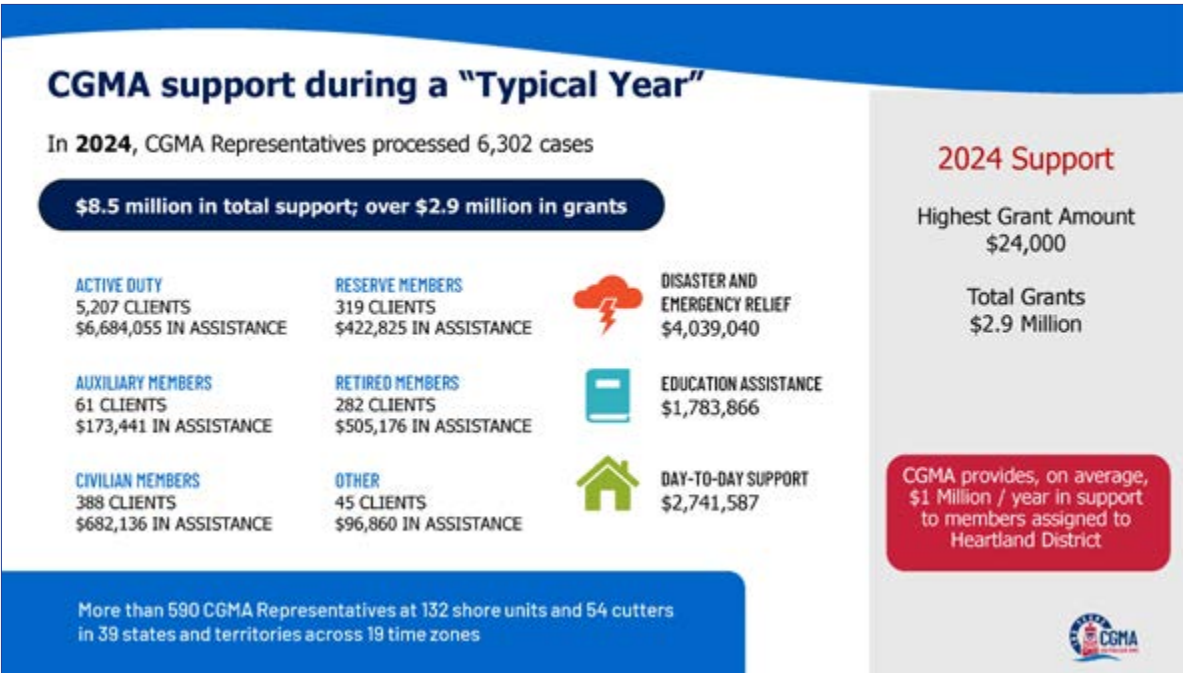
She encouraged thoughtful consideration of company needs as they grow, particularly when growth accelerates rapidly. She noted that risks, such as aging infrastructure or waterway utilization limitations were important factors to consider. She also named areas such as AI and cyberspace, extreme weather events or occurrences that might disrupt business, security, as well as company staffing as crucial components for long-range planning. Rodriguez stressed the value of establishing partnerships at local, state and federal levels before an emergency or crisis occurs.

Summing up, Rodriguez said, “My promise to you, is that we, the Coast Guard, stand ready to lead in crisis. But our success depends on your success. So together, we must continue to ensure our waterways are safe and secure and continue to move forward in the future.”



October Commerce Club Featuring Brooke Millard, CEO, Coast Guard Mutual Assistance

CGMA Provides Lifeline for Coast Guard Community



Brooke Millard, CEO of Coast Guard Mutual Assistance (“CGMA”), was the guest speaker at the Port Bureau’s October Commerce Club luncheon. Millard joined the organization after a 21-year Active-Duty career as a cutterman and writer in the U.S. Coast Guard (“Coast Guard”).

Millard opened her presentation by highlighting some exceptionally memorable moments of her Coast Guard career that included participating in an international exercise off Greenland and enforcing international fishing policy near the Flemish Cap. She named a drug interdiction mission in Colombia as among her most exciting missions.

During a partial government shutdown in late 2018, Millard served on a voyage of the tall ship Eagle. She saw firsthand how relief provided by CGMA lessened financial stress and benefited the crew. This experience was one of the reasons she joined the CGMA team.

Millard explained that the organization is the official relief society of the Coast Guard. For more than a century, it has been the lifeline for the Coast Guard community. CGMA serves as a vital financial safety net, promoting financial stability and general wellbeing, fostering high morale, and encouraging a sense of loyalty to the Coast Guard. While CGMA works closely with the Coast Guard, it is an independent nonprofit charitable organization

Millard shared several examples of how the organization helped Coast Guard families through providing disaster relief aid after storms, loans, and government shutdown support. She described how such

circumstances as relocation can be a difficult challenge for Coast Guard families. In such cases, CGMA can provide a grant to help cover upfront costs that a relocating family could not manage on their own.

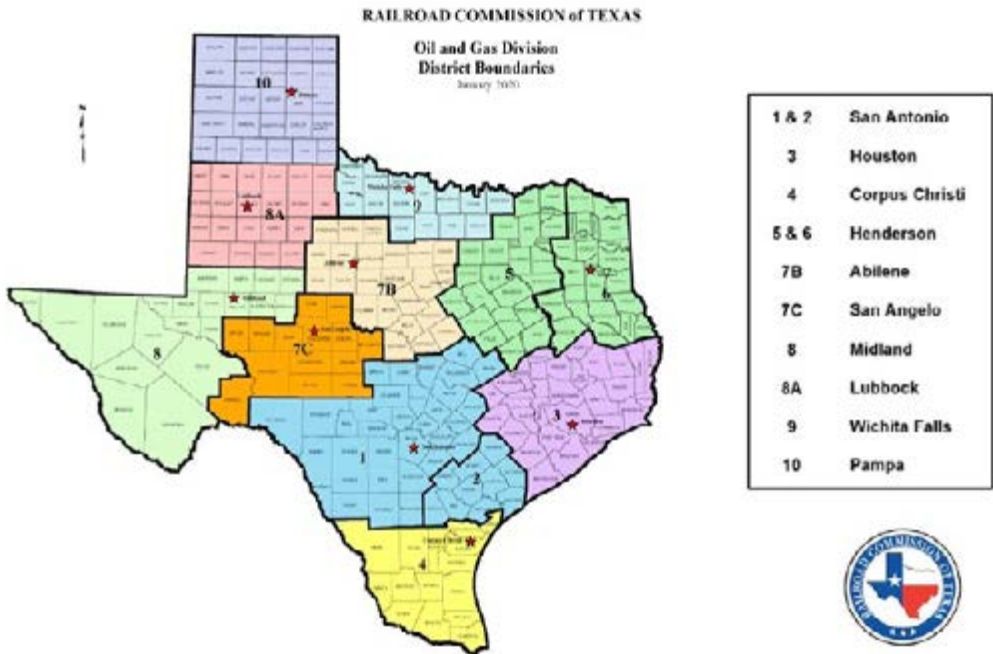
“CGMA seeks to ensure every family has the support they need to thrive, wherever service calls,” said Millard.

During 2025, CGMA delivered \$3.1 million in grants and \$8.5 million in loans. CGMA does not receive any government funding and is entirely donor-funded. For more information, visit mycgma.org.



November Commerce Club Featuring Commissioner Christi Craddick, Railroad Commission of Texas

Railroad Commission Enhances Efficiency to Move Projects Forward



Commissioner Christi Craddick of the Railroad Commission of Texas offered a look into the agency’s mission and top projects at the Port Bureau’s November Commerce Club luncheon.

“It’s nice to be at the Greater Houston Port Bureau and speaking with people who understand how vital both the energy infrastructure and trade are all together and how important it is to the economy in Texas and to American security,” said Craddick in her opening remarks.

The Railroad Commission of Texas (“Railroad Commission” or “RRC”) celebrated 130 years of serving Texans in 2021 and is the state’s oldest regulatory agency. Originally formed to prevent discrimination in railroad charges and establish reasonable tariffs, the Railroad Commission now is primarily responsible for regulating the oil and gas industry, natural gas utilities, pipeline safety, the natural gas and hazardous liquid pipeline industry and surface coal and uranium mining in Texas.

Craddick has been with the Railroad Commission since 2012 and is its current commissioner. “I’ve gotten to see firsthand how Texas leads by not waiting for Washington to tell us what to do, but by working hard, by innovating, and building something real,” said Craddick. “Nowhere is the Texas spirit more visible than right here along the Gulf Coast ... the port of Houston isn’t just another port; it’s the nerve center of the global energy market.”

When Craddick began to serve on the Railroad Commission, the agency faced many challenges. She described it as having outdated systems, slow permitting, and an inefficient process that slowed investment. Today the commission operates with greater transparency, faster permitting, taking drilling permitting from 90 days to 48 hours and modernizing data systems. The data for every well in Texas can be viewed online. Their focus has been to ensure supporting growth without compromising safety or environmental responsibility.

Craddick stressed the importance of the organization’s efficiency. “When the Commission’s working well, projects move forward, jobs get created, and energy flows through ports like Houston faster and safer.” She said

the Texas oil and gas industry created and put \$27.3 billion into state and local taxes in 2024 – approximately \$75 million a day – representing one third of the state’s economy. This supports schools, roads, law enforcement, water, border security, and more. She noted that the oil and gas industry also directly employs nearly half a million Texans with an average salary of about \$128,000 a year.

Looking ahead, the Railroad Commission is making responsible water use a top priority. Water is crucial not only for communities but for refining, shipping, and energy production. The agency has created a “produced water” pilot program. Produced water is water that flows back up after an oil well is drilled. This can result in as much as 15 million barrels of water a day in West Texas. The pilot program encourages recycling and reuse. They are partnering with Texas universities, such as Rice and Texas Tech, as well as industry stakeholders to advance new technologies that conserve freshwater while keeping energy production strong. The agency has worked to modernize waste management and recycling standards, ensuring environmental safeguards effectively match current technology.

The Railroad Commission has also created the Texas Hydrogen Policy Council to ensure hydrogen development strengthens rather than replaces the existing energy foundation. “Texas is leading the way in hydrogen and advanced fuels, all critical to the port of Houston. In fact, you have a big hydrogen mix right here. This port’s poised to become the nation’s leading hydrogen export hub, connecting new energy technologies with global demand,” said Craddick.

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- February 12: GHPB Annual Meeting & Commerce Club Luncheon with Harris County Judge Candidates Panel Discussion hosted at HYATT REGENCY BAYTOWN!
- April 16: Sailing Towards New Horizons-Fleet Week
- August 22: 97th Annual Maritime Dinner-SAVE THE DATE
- November 2: 18th GHPB Annual Captain's Cup Golf Tournament-SAVE THE DATE

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