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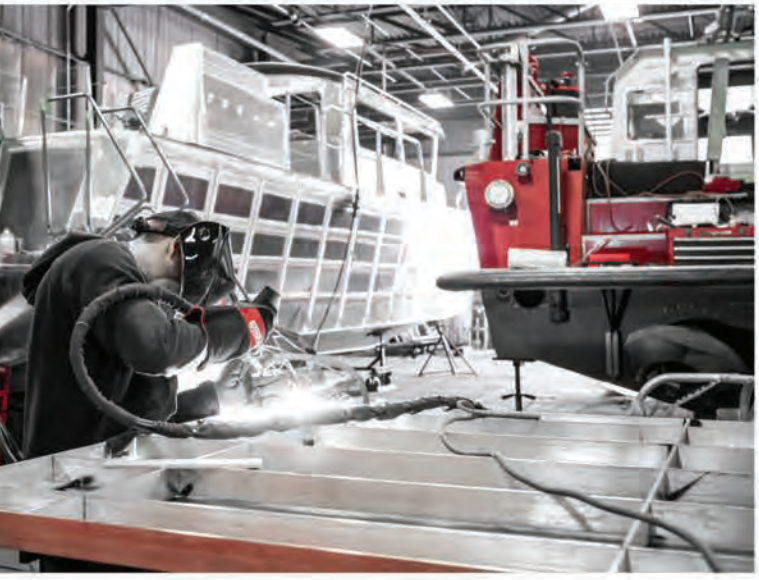

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Features

ON THE COVER

The Response Boat Medium (RB-M) is a pure all weather, patrol, search and rescue vessel. These high performance response vessels fit well into any federal, commercial, and foreign asset portfolio. As it turns out, Vigor Industrial has plenty of experience in all three venues. The story begins on page 36.

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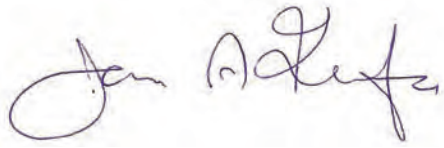
Combat & Patrol Craft. Short Sea Shipping. Lubricants. And, there's Oil Spill Prevention and Response. It isn't that often that I get to present an edition that encompasses so many diverse and seemingly disconnected topics, but this month's version does just that. And yet, once packaged into the format that only ***MarineNews***, in this genre, can deliver, it all makes perfect sense. Turning the pages of this edition, you'll soon see why.

In both a challenging economic and regulatory climate – like the one we find ourselves wading through today – it is tempting to eschew the little things that cost money but perhaps don't necessarily improve our bottom lines. On the other hand, and as the regulatory noose cinches ever tighter, that's probably a mistake. To that end, this month we explore the environment from all angles; the EPA's VGP and viable solutions for compliance, the use of economical multi-mission boats for spill response, analysis of recent developments in the all-important area of responder immunity, and we tie it all together with some sage advice from one of the most experienced environmental professionals on the planet. Listen in as Steve Candito explores the full range of issues facing oil spill responders and maritime stakeholders alike.

It is indeed a challenging business climate. We found that out as we assembled our annual outlook for the Combat & Patrol Craft sector. That said; and while it may be a little quiet on the federal side of the equation, there's plenty of good news elsewhere. This is always a good time to remind folks that the U.S. workboat builder can and does compete in a robust way across the proverbial pond. Indeed, the export market for U.S.-built craft is active, with more than a few hulls produced for foreign governments – especially when it comes to small military craft. But, as we also found out, you need to spend some money in order to make a lot more, down the road. West Coast-based Vigor Industrial has done just that in recent years; both through savvy acquisitions and providing a focused boots-on-the-ground presence in key offshore markets. That story begins on page 36.

Finally, the thoughts and ideas of Bob Kunkel are always an apt way of addressing any number of current events and tough issues. This month, he takes on shortsea shipping, the always controversial Jones Act discussion, the state of oil, the economy, and at the same time offers options for consideration. Kunkel – agree or disagree – is never boring and always well informed. Often, you'll find him at the pointy end of some new and innovative service, newbuild or enterprise – both here and across the big pond. Arguably, that's the kind of tenacity that will lead us out of the current malaise and onto our next 'up' cycle.

That up cycle is coming. I see it when I get out of my office and visit the rough-and-tumble waterfront. I hear it from you every day. As it evolves, you'll read about it here in ***MarineNews***.



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Green Waterways and the Bureau of Transportation Statistics

The American Waterways Operators (AWO) and Waterways Council (WCI) released a fact sheet highlighting the efficiencies of the nation's waterways. At the same time, the Bureau of Transportation Statistics (BTS) released the 11th edition of *Freight Facts and Figures.* Hence, it is a good time to see if the AWO/WCI numbers stack up.

• **CAPACITY COUNTS:** According to the AWO/WCI, in 2014, 604 million tons of cargo valued at $232 billion moved on the inland waterways system. Unfortunately, that 604 million tons represents but 4 percent of the totals moved domestically, with trucking moving the lion's share of that freight, followed in distant second place by rail, according to the BTS. Hence, despite the fact that one 15-barge tow carries as much cargo as 1,050 semi-trucks, or six locomotives pulling 216 rail cars, shortsea shipping has failed to gain the attention of the federal government. If all cargo moved by inland barge were put in tractor trailers across our nation's interstate highway system, truck traffic would increase by 83%. Moving that cargo by rail would increase the nation's rail tonnage by 25%.

• **SAFETY:** Regional oil shipments by rail increased from less than one percent in the first six months of 2010 to 22.6 percent in the first six months of 2015. Tankers and barges move crude oil on U.S. inland waterways, from port to port along the coast, or on the Great Lakes. *The use of tankers and barges for oil transport has risen as well, from 2.1 percent in the first 6 months of 2010, but only to 3.2 percent in the first 6 months of 2015.* Despite the proven safety advantage of barges over rail, shippers continue to favor railways, even when waterways are close.

• **CLEAN AIR:** No other mode of transportation compares to barges in minimizing carbon dioxide emissions. Based on emissions of CO2 per-million-ton-miles of cargo moved, trucks emit 171.83 tons, rail emits 21.35 tons, while barges produce only 16.41 tons. Barge transportation minimizes noise as vessels glide silently through the water, away from shorelines and population centers.

• **CLEAN WATER:** Without a doubt, the environmental footprint of the marine industry, especially in terms of oil pollution, has been improving dramatically and measurably over time. That said, and looking at BTS Table 6-17, *2014 (the latest year for which statistics exist) wasn't the best year for America's tank barges,* with almost 200,000 gallons of oil spilled into the water, a marked increase from the previous year, but also just 20 percent of what was spilled in 1990. So, there is room for improvement still. Fortunately, the subchapter M towboat rules are right around the corner.

• **FLEET COMPOSITION:** The average age of the U.S. flag fleet decreased over the 2000 to 2013 period: vessels age 15 years and younger decreased from 46 to 33.9 percent. And says BTS, inland waterway barges accounted for the largest share (77.7 percent) of U.S. vessels. *Unfortunately, towboats are the oldest vessels in the fleet with 68.9 percent older than 25 years.* No doubt the new EPA Tier emission rules, subchapter M requirements and other factors will result in a fair amount of this fleet being renewed in the short term. *Certainly, the nation's shipyards could use the business.* In contrast, barges are among the youngest vessels due to a combination of retirement and replacement of older dry cargo barges and acquisition of new tank barges. Although the total number of domestic vessels has decreased, inland numbers are on the rise.

• **EFFICIENCY:** Trucks can move a ton of cargo 150 miles for each gallon of fuel burned. Newer railroad locomotives can move that cargo 478 ton-miles per gallon, but barges pushed by towboats can move it 616 ton-miles per gallon. Advantage: inland waterways! Unfortunately, says BTS, and although river locks make it easier for vessels to navigate the uneven water levels of U.S. rivers, the U.S. Army Corps of Engineers reports that the average age of all locks in 2014 was 59 years. *Between 2000 and 2014, average delay per lockage nearly doubled from 64 minutes to 121 minutes.* Meanwhile, trucks on congested highways substantially impede interstate commerce. Recurring congestion slows traffic on 5,800 miles and creates stop-and-go conditions on 4,500 miles of the National Highway System, which carries more than 8,500 trucks per day. Beyond this, assuming no change in network capacity, the number of NHS miles with recurring congestion and the number of large trucks is forecast to increase significantly between 2011 and 2040. It really is time to move that cargo onto the river, but not if we can't upgrades our locks and infrastructure. Read the full report at **www.rita.gov**

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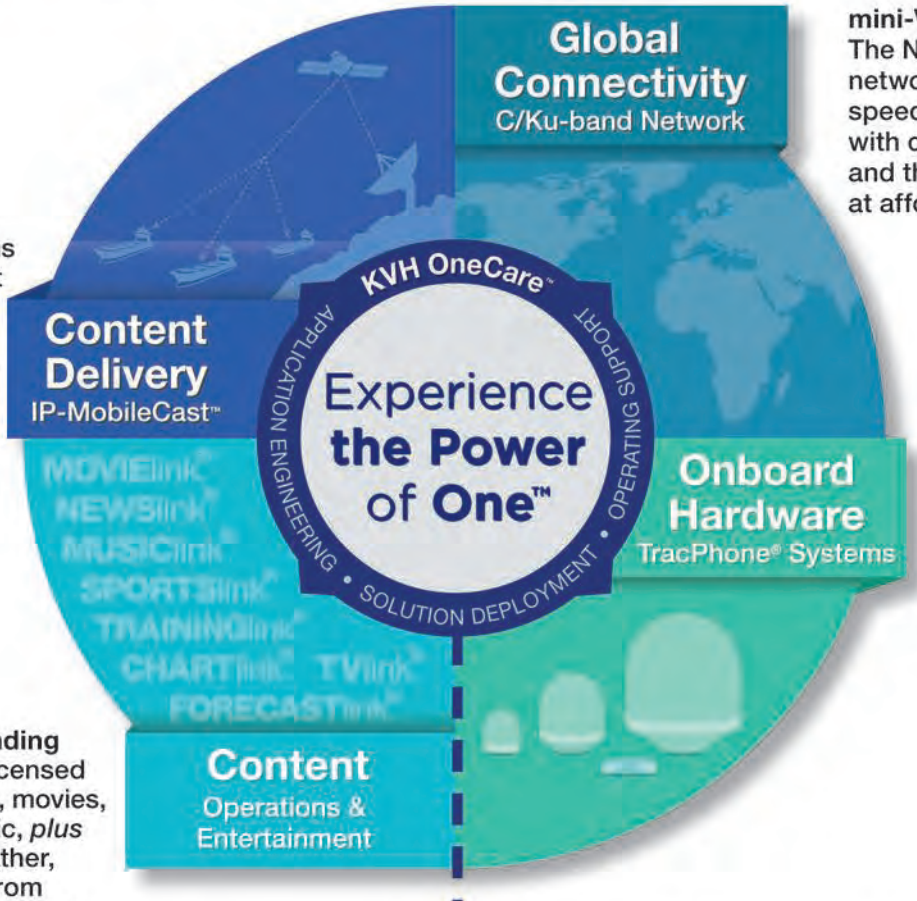

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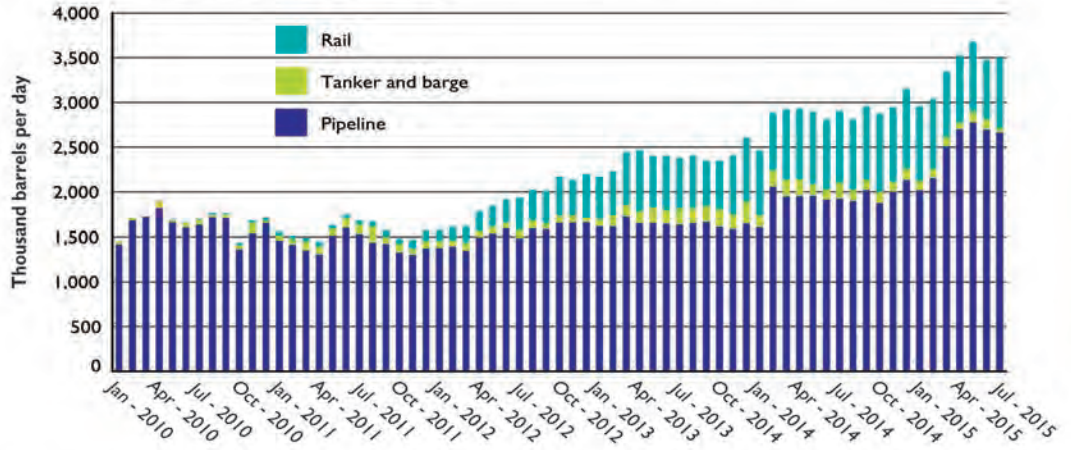
U.S. Flag Vessels by Type, Number and Age: 2000, 2010, and 2013 (BTS)

Type (#)	Dry Cargo	Tanker	Towboat	Passenger	Crewboat	Dry Barge	Tank Barge	TOTAL
2000	737	135	4,995	918	1,414	29,141	4,011	41,354
2010	875	77	5,466	843	1,817	26,848	4,564	40,512
2013	844	65	5,473	833	1,645	**26,387**	4,694	**39,999**
Age (Yrs)								***
2000	16-20	21-25	21-25	16-20	16-20	16-20	21-25	16-20
2010	21-25	21-25	>25	21-25	>25	11-15	16-20	16-20
2013	21-25	11-15	**>25**	**>25**	21-25	11-15	11-15	16-20

Figure 2-3 Shipments of Crude Oil Moved by Pipeline, Tanker and Barge, and Rail: January 2010–July 2015



SOURCE: U.S. Energy Information Administration based on data from the Surface Transportation Board and other information, October 2015.

Table 6-17 Number and Volume of Oil Spills In and Around U.S. Waterways: 1990, 2000, and 2012–2014

	1990		2000		2012		2013		2014	
Source	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled	Incidents	Gallons spilled
Total, all spills	**8,177**	**7,915,007**	**8,354**	**1,431,370**	**3,266**	**196,183**	**3,223**	**497,710**	**3,077**	**668,363**
Vessel sources, total	**2,485**	**6,387,158**	**5,560**	**1,033,643**	**1,824**	**131,986**	**1,721**	**207,106**	**1,716**	**273,432**
Tankship	249	4,977,251	111	608,176	27	3,864	20	711	18	146
Tank barge	457	992,025	229	133,540	93	33,268	100	19,568	89	199,667
Other vessels[1]	1,779	417,882	5,220	291,927	1,704	94,854	1,601	186,827	1,609	73,619
Nonvessel sources, total	**2,584**	**1,408,472**	**1,645**	**373,761**	**1,048**	**51,040**	**1,048**	**284,513**	**963**	**386,350**
Facilities[2]	73	46,228	4	17	16	251	35	6,028	41	5,267
Pipelines	76	270,700	21	17,004	0	0	0	0	0	0
All other non-vessels[3]	2,435	1,091,544	1,620	356,740	1,032	50,789	1,013	278,485	922	381,083
Mystery	**3,108**	**119,377**	**1,149**	**23,966**	**394**	**13,157**	**454**	**6,091**	**398**	**8,581**

[1]Other vessels include commercial vessels, fishing boats, freight barges, freight ships, industrial vessels, oil recovery vessels, passenger vessels, unclassified public vessels, recreational boats, research vessels, school ships, tow and tug boats, mobile offshore drilling units, offshore supply vessels, publicly owned tank and freight ships, as well as vessels not fitting any particular class (unclassified).

[2]Facilities include mobile offshore drilling units, offshore supply vessels, offshore platforms, designated waterfront facilities, fixed platforms, mobile facilities, and municipal facilities.

[3]All other non-vessels include aircraft, land vehicles, railroad equipment, bridges, factories, fleeting areas, industrial facilities, marinas, common carriers, sewer drainage, shipyard/repair facilities, and shorelines.

SOURCES: **1990 and 2000**: U.S. Coast Guard, *Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium: 1969-2011* (Washington, DC: January 2013), tables *Number of Spills by Source, Volume of Spills by Source (Gallons) and Oil Spills In U.S. Waters Calendar Year*, available at http://homeport.uscg.mil/ as of August 2015. **2012-2014**: derived from Pollution Incident Investigation records from the Marine Information for Safety and Law Enforcement System (MISLE) as of August 2015. The Polluting Incidents In and Around U.S. Waters, A Spill/Release Compendium is not currently being published. U.S. Coast Guard, Office of Investigations and Analysis, CG-INV JGLaw.

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Steven Candito is the Founder, President and CEO of Foresea, which provides advisory services including strategic planning, regulatory compliance and crisis management to the maritime and environmental communities. Previously, Candito was President and CEO of NRC. He has extensive experience with OPA 90 compliance issues with particular focus on vessel owner and insurance matters. Before that, Candito was an attorney with Haight Gardner Poor & Havens, specializing in maritime and environmental law. Candito has also served as a marine engineer aboard Exxon USA's domestic tanker fleet. He is a graduate of Hofstra University School of Law and the United States Merchant Marine Academy. A past President of the Spill Control Association of American (SCAA), his roots in the oil spill response and environmental communities run deep. Listen in this month as he weighs in on environmental issues, pollution prevention and response.

Macondo: The six-year anniversary of this spill has come and gone. Talk about the lessons learned.

The main lesson that both responders and regulators learned from the Macondo spill is that it is impossible to have sufficient dedicated spill equipment available for a spill of generational magnitude, but it is a challenge even under the current regulatory "worst case discharge" standard. The dedicated resources required by the existing regulations were certainly of significant benefit during the first days of the spill, but when a response covers a large geographic area and lasts for months, additional non-dedicated resources will always be needed. Although NRC provided a significant amount of the dedicated resources used on the Macondo spill, NRC really distinguished itself by sourcing a tremendous amount of non-dedicated resources through its subcontractor network.

You were involved with Macondo in your former role. What worked best in that response and what, with 20/20 hindsight, might you have done differently?

The use of non-dedicated resources worked well and made a difference, but some of the innovations at the time were also very helpful, such as the Big Gulp barge skimming system. The Big Gulp is a very straightforward and simple weir skimming system that was outfitted on non-dedicated barges. These systems provided a larger swath, width and faster advance rates than more traditional skimmers. These two attributes resulted in an increased encounter rate, which actually became the focus of the Bureau of Safety & Environmental Enforcement (BSEE)'s newly proposed skimmer capacity rating system known as Estimated Recovery System Potential (ESRP), which are a direct result of the Macondo spill. The Big Gulp systems probably had the best recovery efficiency under the Macondo spill circumstances where the oil was well offshore and contaminated with debris. On what I would have done differently, given the significant litigation that NRC and many of the other clean-up companies became involved in over the use of dispersants, I would think twice before providing dispersant resources again, unless there is some tightening of OPA 90's responder immunity provision or there is additional cost effective insurance options, which does not seem likely now that the insurance companies have a better understanding of this significant risk.

The proposed Vessel Incidental Discharge Act (VIDA) looks to unify and simplify both the regulatory and compliance aspects of vessel discharges. Currently, those regulatory duties are split into many camps. What's your take on the legislation?

I certainly support VIDA, but I have my doubts that the legislation will pass. Legal uniformity is one of the basic tenets of the law generally and specifically admiralty law so the legislation certainly makes good sense from both a legal and operational perspective. Further, there appears to be wide industry support from vessel owners and even labor unions, terminals and port authorities. There is also bipartisan support in Congress. Unfortunately, our current legislative process has become so dysfunctional that this needed legislation still may not pass, particularly with the upcoming presidential election and a truncated Congressional calendar this year.

Bring us up to speed on any emerging developments in the oil spill prevention and response fields. What new products and methods are emerging?

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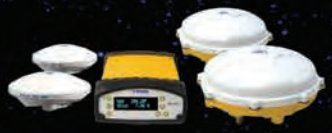

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is certainly needed in the oil spill response field. Unlike other industries, however, there is not the same economic incentive to invest capital in response resource R&D because the predictable return on investment is simply not there. No one knows when the next big spill will happen. Thus, advancements in the oil spill response industry are likely to come from technologies that have other uses beyond just oil recovery. A great example is drones. Drones have become readily available and already have a role to play in oil spill response in both detecting and tracking oil. I expect that similar technology advances will also eventually lead to more efficient skimming systems.

BIMCO and the International Spill Control Organization (ISCO) have begun work to develop a standard contract for the hire of spill response services and equipment. Do you support this sort of effort?

BIMCO is certainly on the right track in trying to develop an agreement that fairly apportions risks between the parties on critical issues such as payment terms, liability and insurance. This type of standard agreement could save valuable time at the critical early stages of a response. As we know, this issue was addressed in OPA 90 in that potential responsible parties must have a contract arranged prior to conducting oil operations in the U.S. Thus, although there is more of a need for this type of standard contract outside the U.S., BIMCO should still keep in mind lessons we have learned here in the U.S. while drafting the agreement. The SCAA has reached out to BIMCO and offered their assistance. I hope BIMCO takes them up on the offer.

The new OPA 90 NPREP (Drill & Exercise) requirements promise significant changes. SMFF providers now have a greater obligation and there will be more unannounced drills. Tell us about the new rules.

Like many other positive initiatives, over time, complacency can take hold and that is what is occurring in the drill and exercise arena. Today, many drills that were intended to really test the responsible parties, their spill managers and OSROs have become more of a seminar. In that seminar format, few real time decisions are made and people and resources are not truly tested. There clearly was a need to refresh the OPA 90 NPREP requirements and the new SMFF regulations were a good catalyst for doing it now. That's the good news. The bad news is that these drills will become more expensive and time consuming under the new requirements. Further, the timing is somewhat unfortunate since both the oil & gas industry and non-tanker shipping sector are in no mood for increased costs with low oil prices and charter rates.

Lately, there has been some progress on Responder immunity. Give us a report on what's next.

There was a recent decision in the Macondo litigation that was favorable to the cleanup companies because it confirmed governmental "derivative" immunity for responders. Unfortunately, the decision did not go far enough because many responses do not have the right circumstances for derivative immunity to apply. Thus, there is still a need to tighten up OPA 90's responder immunity protection and unless that occurs, I certainly would think twice before responding with dispersants.

Ballast Water Treatment is coming to a head here in the United States. Bring us up to speed.

Just to be clear, the Coast Guard's position does not disqualify UV systems as opposed to biocides. The Coast Guard's position that the organisms must be "dead" rather than "non-viable" means that the large flow UV systems will simply be too energy intensive to operate cost effectively. I still think there will be 2,000m3/hr and less UV systems that could be an option, even under the Coast Guard's current interpretation. I am aware that a number of UV manufacturers believe Congress will change the wording of the U.S. law to allow the non-viable Most Probable Number (MPN) testing method used in the IMO regulations to be used here in the U.S. I do not see that happening. In fact, it reminds me of the early days of OPA 90 when the P&I Clubs refused to issue Certificates of Financial Responsibility (COFR), thinking the U.S. regulators would back down. Those of us who are old enough to remember know that the regulators did not back down and an entire sub insurance industry of specialty COFR providers formed to fill the regulatory need. Although the regulatory need was satisfied, it occurred at a tremendous, and probably unnecessary, cost to vessel owners. Hopefully, we can avoid a repeat of that situation.

Should shipping firms install BWT systems in the absence of Coast Guard approved systems?

At the recent MEPC 69 meeting in April, rather than receiving some clarifications, the uncertainty continues and it continues on some very critical issues such as whether to allow existing vessels to continue to use ballast water exchange and how to address "early movers" who have installed systems that met the original IMO G8 Guidelines, but may not meet the new Guidelines or the Coast Guard regulations. Hopefully, we will know more after the MEPC 70 meeting in October, but vessel owners should not wait until then to take action. I don't recommend installing a system before we know more on the IMO regulations and systems receive Coast Guard approval. Some operators are taking steps to be prepared to move quickly once that occurs including: determining which type of system is best for their vessels, ensuring there is sufficient space to install the system, retaining engineering and installation resources, and requesting an extension from the USCG and a new MARPOL Annex 1 IOPP Certificate. Preparing a structured plan for ballast water compliance by making minimal commitments today will be good insurance against the

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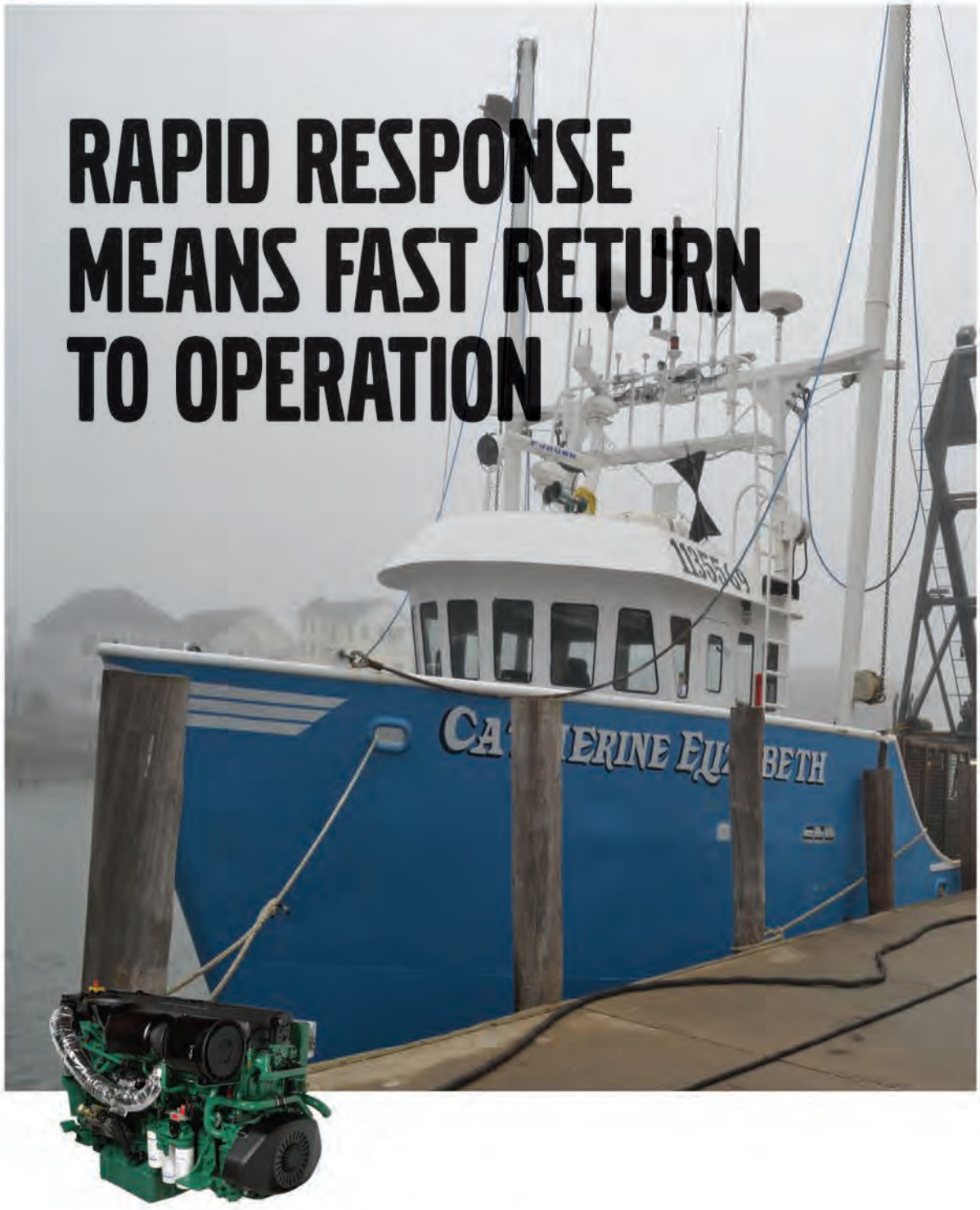
RAPID RESPONSE MEANS FAST RETURN TO OPERATION



When Jaime Sawyer, fleet manager of Truex Enterprises in Atlantic City, NJ, experienced a complete gear failure that destroyed the nine year old Volvo Penta D16 engine on his commercial clam boat, Catherine Elizabeth, he had to make a quick decision: rebuild or buy new.

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"The company's excellent service and hard work, combined with instant engine availability from Volvo Penta, got the boat on the water two weeks earlier than rebuilding the engine."
– Jamie Sawyer

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The Discoverer Enterprise, Q4000 and many other vessels worked around the clock cleaning up the Deepwater Horizon oil spill in the Gulf of Mexico.

Photo: SGT Casey Ware, U.S. Army

increased costs and operational restrictions that are likely when the majority of the industry is doing so later. Installing and successfully integrating a ballast water treatment system is complex and there are only so many competent resources available. The compliance window is far smaller than the IMO intended, creating far higher demand for production, engineering and installation resources. Thus, it is critical that owners take these steps now, which may seem premature, but these costs will be minimal, compared to the risks of choosing the wrong system or vessel delays for noncompliance, if the vessel owners wait too long to act.

As the regulatory noose tightens, in terms of vessel discharges of any kind what is the most pressing issue facing vessel operators today?

I am amazed at how vessel owners keep up with all of the regulatory challenges they face. However, the ballast water issue is the most pressing because of the regulatory uncertainty, technological challenges and huge number of vessels that have to gain compliance in a relatively short time frame make ballast water treatment the most problematic issue.

Much is made of the EPA's so-called small VGP and the VGP that applies to larger tonnage. What's the difference between the two, who is governed by which, and is sVGP in play today for anyone?

This issue is another headache for shipowners with 27 different discharge sources identified in the legislation, but at least there has been some reprieve. The EPA initially issued the sVGP back in 2014 for the control of incidental discharges for vessels less than 79-ft. However, as a result of subsequent legislation, these smaller vessels are not required to obtain coverage under that permit until December 18, 2017, except for any ballast water discharges. That same legislation also exempted commercial fishing vessels of all sizes from having to obtain the sVGP for those incidental discharges, again except for ballast water, until December 18, 2017 as well. There is no exemption for inland workboats so if they are over 79-ft. they have to comply now and if they are under 79-ft. will have to comply as of December 18, 2017.

Salvage goes hand in hand with spill response. Where do the two business models converge and where do they fall under different rules and parameters?

In the first instance, the business models for salvors and OSROs should be the same in that they are both required to maintain significant resources to respond to unpredictable, meaning without regularity, emergencies under OPA 90's regulations. Thus, in order to support those standby resources it makes sense that the salvors and OSROs should receive retainer fees to purchase and maintain those resources as well as train and employ personnel and not only be compensated at the time of an event. As the market developed, however, the OSROs are receiving reasonable retainer fees, but the salvors are not. This inconsistency occurred because the OSROs had significant requirements from OPA 90's start, but the more prescriptive SMFF requirements did not come into force until recently, well after the vessel owners became accustomed to no charge or very low fee SMFF OPA 90 coverage. Of course, the salvors also had the benefit of potentially large LOF awards at one time, which may have somewhat justified the free coverage. With the advent of the vessel response plan (VRP) and contracted salvors, the use of LOFs has decreased and along with it, the likelihood of a large LOF award. Thus, the time has come for OPA 90 salvors named in a VRP to receive reasonable retainer fees to ensure they can maintain the required resources. Vessel owners may find themselves in a very precarious situation, if their contracted SMFF provider does not respond adequately since the obligation remains with the responsible party vessel owner. Further, although the vessel owner may have a claim against the salvor for an insufficient response, from the practical legal perspective, it is hard to argue there was a firm commitment to respond when "adequate consideration" was not exchanged to bind the parties to a contract. As a result, I advise my clients that they must thoroughly vet their SMFF provider to ensure proper resources are available. I also recommend they pay some reasonable retainer fee to ensure the SMFF provider's commitment to respond is binding. From a risk management perspective these fees will seem trivial compared to the liability risks, if the response does not proceed properly.

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Ready or Not, Here it Comes

In January 2016, both the FASB and IFRS announced the finalization and formalization of a rule change that will impact lease assets … including boats, ships and barges.

By Richard J. Paine, Sr.

Paine

FASB, IASB, GAAP, IFRS. If you are an accountant or CFO of a company, this alphabet soup means something special to you. It is shorthand for the names of the organizations that establish standards by which you report on the financial condition of your company.

The Financial Accounting Standards Board (FASB) has since 1973 been the organization in the nongovernmental sector that has established and refined accounting standards for the preparation and reporting that govern financial reports. The Security and Exchange Commission (SEC) officially recognizes those standards to substantiate the credibility, accuracy and clear reporting of financial information.

FASB's stated mission is to "establish and improve standards of financial accounting and reporting that foster financial reporting by nongovernmental entities that provides decision useful information to investors and other users of financial reports." Similarly, the International Accounting Standards Board (IASB) is responsible for best practices of the international financial reporting sector with the same goal. These domestic and international organizations provide the rules of the road in, respectively, the Generally Acceptable Accounting Principles (US-GAAP) and the International Financial Reporting Standard (IFRS). The standards are both similar and divergent in their reporting standards.

Rule Change

In January 2016, both the FASB and IFRS announced the finalization and formalization of a rule change that can and will affect the way private and publicly-traded businesses report their financial condition.

Russell Golden, FASB Chairman explained, "... the new guidance responds to requests from investors and other financial statement users for a more faithful representation of an organization' leasing activities ..."

There are essentially two types of leases: operating leases and capital leases. Long considered rental agreements, operating leases were reported "off balance sheet;" whereas capital leases were considered financing agreements and are reported as debt on the balance sheet. Although an operating lease or nautically – a bareboat charter – is a contract specifying a rental agreement for a given period of time, it was implied to be a liability (the" lease liability"), but not true debt. Beginning in 2005, with some false starts and stops, The FASB finally began to address the issue which culminated in the new ASU 2016-2 Leases (Topic 842) and the IASB in IFRS 16 reporting protocols.

Phasing in the new FAB

Because of the change, other than for short term leases, FASB will consider operating leases as capital leases and be reportable on a company's balance sheet as such. Happily, this will not happen overnight. Phase in will have three milestones, the first for public companies whose fiscal year begins after December 15, 2018 an the second on December 15, 2019. A third for interim statements will phase in within fiscal years beginning after December 15, 2020.

Importantly, the new standards affect all companies that lease assets such as real estate, construction equipment, airplanes or ... *boats, ships and barges.*

Although similar, there are some differences between FASB and IASB treatment, both define leases as a contract that conveys the right to use the equipment for a period of time in exchange for payment of some kind. If a company has control over the leased asset, derives economic benefit from its use and the right to specify how and where the asset is used the previous rules of capital lease vs. operating lease go out the window. All leases are reported as capital leases.

Formerly, the rules that governed the categorization of a lease as operating or capital were relatively and refreshingly simple:

Capital Lease (On balance sheet)	Operating Lease (Off balance sheet)
Ownership is transferred to the lessee	Lessor retains ownership of equipment after lease termination
Leases contains a bargain purchase option to buy at less than fair market value	Lease cannot contain a bargain purchase option
Lease term equals or exceeds 75% of equipment's estimated life	Lease term is < 75% of the economic life of equipment
Present value of lease payments > 90% of original cost	Present value of lease payments < 90% of equipment's fair market value

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"Because of the change, other than for short term leases, FASB will consider operating leases as capital leases and be reportable on a company's balance sheet as such. Happily, this will not happen overnight."

Under the FASB rules, the method of reporting for an existing operating lease will also change and be subject to new US standards, which can be seen at: www.fasb.org.

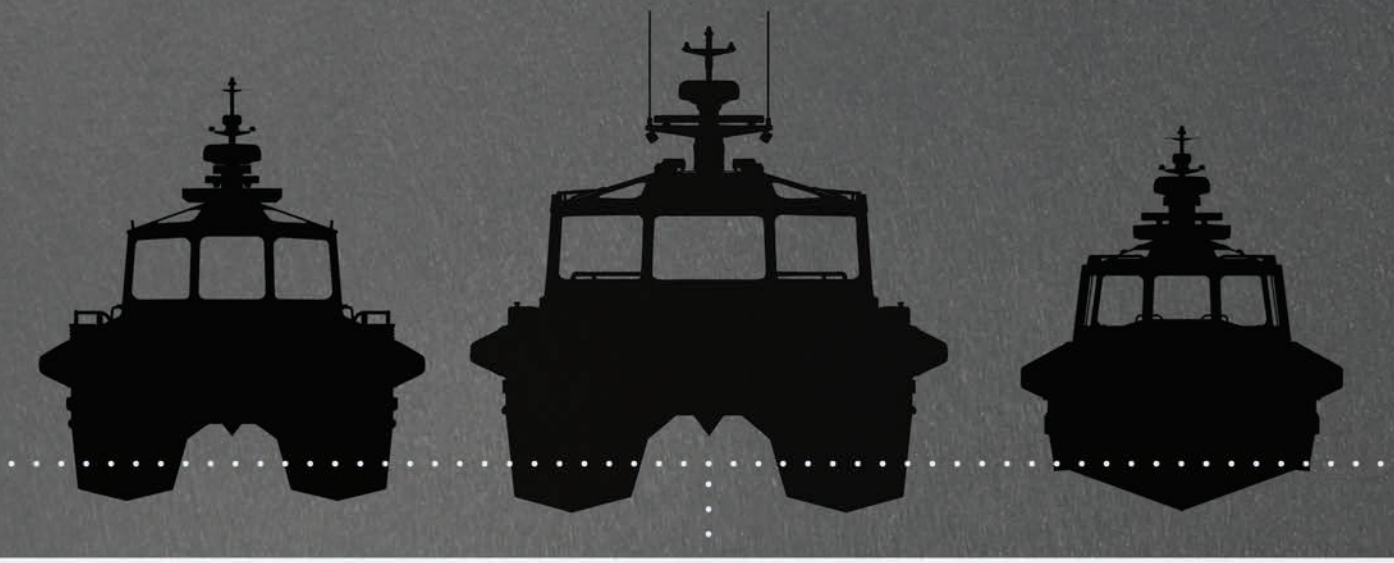
Implications for You: ready or not …

What is the Upside? All the benefits of leasing will remain the same, maintaining cash flow, preserving capital, avoiding obsolesce and enjoying the flexibility of the lease to suit your needs. Depreciation of the asset and interest expense will be on the lessee's balance sheet. Rent will no longer be deductible.

Downside? It has been estimated that nearly a trillion dollars in debt will migrate from the off-balance sheet to on-balance sheet reporting. The change will affect debt ratios, profits and possibly call for the re-writing out-of-compliance covenants.

Bottom Line: If you prepare financial reports for either domestically and internationally or both, there is a sea change coming. Prepare yourself and your company by working with your accountant or finance professional to understand, anticipate and implement how these reporting changes will affect you and your future.

The author is a 30 year veteran of the commercial marine industry and can be reached at rpaine@optonline.net; or 516-395-1860.



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Tiburon, CA Fire	Richmond, CA Fire
Placer County Tahoe Sheriff	North Kingstown, RI Fire
New York Naval Militia	Richmond, CA Police
Lewes, DE Fire	Bellingham, WA Fire
Contra Costa Co. Sheriff	California Dept. of Fish & Wildlife
Massport Fire	Anne Arundel Co. Fire
New York City Police	Massachusetts State Police
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Additional Insured Coverage – Make Sure That Marcel is Your Friend

A mechanism where companies can provide additional insured coverage to their clients that overcomes LOIA restrictions.

By Larry DeMarcay

DeMarcay

The logistics of operating vessels are difficult and require the teamwork of a large number of companies. The team often includes companies that provide vessels, crew, catering, equipment, supplies and repair vendors. As many of these relationships are long term in nature, but require sporadic use, the parties often enter into a master service agreement that outlines the terms of the service. Many of these agreements include mutual indemnity obligations where each party usually accepts responsibility for indemnifying the other party for injuries to their employees. Under maritime law, such indemnities are valid.

Know the Law

Unfortunately, if you are working around fixed platforms, docks, or other locations that fall within the scope of the Longshore Act or state law, several states, including Louisiana, have adopted anti-indemnity statutes that prohibit indemnity obligations in an attempt to protect smaller companies that do not have the bargaining power needed to negotiate with large oil companies and other large marine operators.

Although all states with anti-indemnity statutes prohibit indemnification, several states allow for the procurement of insurance coverage that creatively indemnifies the other party, via additional insured coverage, for injuries to these employees. However, the applicable rules vary from state to state. For example, on the Gulf Coast, Texas allows for such additional insured coverage where Louisiana does not.

Under Louisiana law, any provision in any agreement that requires additional insured insurance protection is prohibited by the Louisiana Oil Field Anti-Indemnity Act (LOIA) and is null and void and of no force and effect. So, if you are operating in Louisiana waters, or off of the coast of Louisiana, and you sustain an incident where you may be entitled to additional insured coverage, the statute, on its face, prohibits such coverage.

The Marcel Exception

All is not lost. The courts have carved out an exception to this additional insured prohibition. It provides a mechanism where companies can provide additional insured coverage to their clients or customers that overcomes these LOIA restrictions. To overcome this restriction, the parties must craft an additional insured provision pursuant to the United States Fifth Circuit Court of Appeal's holding in Marcel v. Placid Oil Co. This exception is commonly referred to as the Marcel Exception and the insurance premium to be paid is referred to as the Marcel Premium.

The Marcel Exception allows for insurance coverage for a prohibited indemnity obligation when the party being indemnified pays for its own additional insurance coverage and no part of the cost of the additional insured coverage is paid by the party procuring the coverage. To meet this requirement, and obtain valid additional insured coverage, the potential indemnitee must pay the premium to the other party's insurance company that covers the costs associated with adding the indemnitee as an additional insured on the policy.

Although many contracts include the language required for the execution of the Marcel Exception, very few transactions, in practice, meet the requirements. In the event that the agreement includes the appropriate Marcel Exception language, but the indemnitee is not provided with an invoice for the procurement of this coverage, or, if an invoice is issued, it fails to pay for the actual coverage, such coverage is not valid. Furthermore, in the event that the amount of premium requested and paid does not reflect the actual cost of procuring the insurance coverage, the provision will be invalid.

This simple process provides many potential pitfalls that can sink your attempt to obtain indemnity. For example, many companies have insurance policies that include a blanket additional insured provision that provides coverage to entities that are contractually named as additional insureds. Although such a provision would be valid absent the anti-indemnity statute, such a provision does not overcome the LOIA restrictions as it does not fully comply with the Mar-

"Under Louisiana law, any provision in any agreement that requires additional insured insurance protection is prohibited by the Louisiana Oil Field Anti-Indemnity Act (LOIA) and is null and void and of no force and effect. So, if you are operating in Louisiana waters, or off of the coast of Louisiana, and you sustain an incident where you may be entitled to additional insured coverage, the statute, on its face, prohibits such coverage."

cel Exception. Although additional insured coverage is procured, the cost of coverage is not paid by the indemnified party. Thus, the additional insured provision is invalid.

On the other hand, if additional insured coverage is provided and the indemnified party is provided with an invoice for the procurement of coverage that does not adequately reflect the cost of such coverage, that transaction is invalid as well. For example, if your contract provides for the procurement of Marcel coverage and you contractually pay $100 for the procurement of a liability policy, the courts will likely find that such payment does not reflect the actual cost of providing insurance to the indemnified party.

Marcel, Mon Ami

So, it is important that you make Marcel your friend. When you enter into an agreement that includes an indemnity provision with the goal of overcoming an anti-indemnity prohibition, make sure that you reach out to your contracting party's insurance broker to determine if additional insured coverage is available, what the actual cost of providing such insurance is, and ask to be billed for the procurement of such coverage. Once you pay this premium, if all of the other elements of the exception are met, you will have valid additional insured coverage despite LOIA's indemnity prohibition.

Although this sounds simple, due to the nature of our business and how these transactions unfold, it is rare that these conditions are all met. Unfortunately, most companies are not aware that they failed to properly comply with the Marcel Exception until it is too late because an accident has occurred and someone is trying to invalidate an indemnity request.

With that in mind, it is probably a good time to review your agreements to check that the indemnity language provides a mechanism for the provision of additional insured coverage under the Marcel Exception and that your company is complying with all of the steps required to obtain such coverage. If it does not appear that you have satisfied the Marcel test, it would not hurt to reach out to the other party's insurance broker to try to obtain such coverage.

Mr. DeMarcay *is a partner in the law firm of Fowler Rodriguez Valdes-Fauli. His areas of practice include Commercial Litigation, Admiralty, Personal Injury, Transportation, Real Estate, Construction and Corporate Law. Prior to attending law school, Mr. DeMarcay served on the Washington based legislative staff of Congressman Jimmy Hayes. On the WEB:* ***www.frvf-law.com***

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The Court Does what Congress has Failed to Do

By Jon Waldron


Waldron

After almost four and a half years of litigation, the U.S. District Court for the Eastern District of Louisiana issued a landmark decision with respect to responder immunity. In the matter of the DWH Oil Spill, MDL No. 2179 (ED La, February 16, 2016), the court granted the clean-up responder defendants' motions for summary judgment with respect to claims asserted against them by plaintiffs who had engaged in a variety of clean-up activities. These plaintiffs claimed they were exposed to oil, dispersants, and other chemicals while doing so and were injured due to this exposure as a result of actions or omissions by the Clean-up responder defendants during the Deepwater Horizon incident.

In short, the court adopted all of the novel arguments jointly presented by defense counsel on behalf of the responder defendants that the plaintiffs' complaints should be denied based on a concept known as derivative immunity and pre-emption. The derivative immunity concept was established over 70 years ago by the Supreme Court for parties acting under the direction and control of the federal government in the exercise of legitimate federal authority. Indeed, this concept was extended to private parties in the context of disaster relief actions taken in response to the 9/11 terrorist attacks on the World Trade Center due to the unique federal interest in coordinating federal disaster assistance and streamlining the management of large-scale disaster recovery projects.

Specifically, the court ruled that the responder defendants, who were under contract or subcontract to the Responsible Party BP, and who thus had no direct contractual relationship with the federal government, can and will share in the federal government's derivative immunity under the Clean Water Act and discretionary function immunity under the Federal Tort Claims Act. Moreover, the court held that under the supremacy clause of the Constitution, the plaintiffs' state claims and federal claims under general maritime law were pre-empted under the Clean Water Act and National Contingency Plan in connection with their response actions where such actions were undertaken consistent with the Federal On-Scene Coordinator's direction during the response effort.

All of the plaintiffs except for 11 were dismissed on the basis and that they failed to raise genuine issues of material fact sufficient to survive summary judgment. None of the dismissed plaintiffs appealed the decision. Following this decision the responder defendants approached the court in an effort to renew their previously filed motions for summary judgment as to the remaining defendants who had provided some written but vague information to the court to support their allegations. The court agreed and has now set the following briefing schedule:

- *Responder defendants to file motions for summary judgment: May 9th*
- *Plaintiffs file Opposition Motion: May 24*
- *Responder defendants file Reply to Opposition Motion: May 31*

So what is the analysis for this case? Have the responder defendants achieved the intended objective of encouraging prompt response after a spill in the future? Will the decision discourage future frivolous and unfounded claims against responders to avoid years of unnecessary litigation and legal fees? In short, as discussed in more detail below, although the February 16, 2016, decision is a great development for the responder immunity defense, responders will probably continue to be sued resulting in continued protracted litigation until some gaps in the current responder immunity regime are closed.

As way of background, following the Exxon Valdez incident in 1989, Congress included a responder immunity provision under the Oil Pollution Act of 1990 ("OPA 90") to protect from liability those individuals or corporations who provide care, assistance, or advice in mitigating the effects of an oil spill. The purpose of the responder immunity provision, as originally enacted by Congress, was to grant immunity from liability lawsuits to responders who act under the direction of the U.S. government. The provision was intended to afford the response industry protection from liability for the spiller's actions and, in doing so, encourage the rapid response to mitigate the impact of a spill.

Unfortunately, the current litigation revealed an unintended gap in the current responder immunity provision. In particular, plaintiffs sidestepped the immunity provision in OPA 90 by suing responders for personal injuries allegedly caused by exposure to the spilled oil and/or the dispersants that were approved for use by the U.S. government and alleged gross negligence and willful misconduct related to the response actions. Since the responder immunity provision does not apply if a responder acts with gross negligence or willful misconduct, or causes personal injury

or wrongful death, the plaintiffs' allegations exposed the responders to the current litigation.

Accordingly, despite the current decision, plaintiffs can still sue responders for gross negligence or willful misconduct. And they can still sue a responder for exposure to oil or dispersants. As this is a district court decision, it provides no case law precedent with regard to future law suits, although a court could decide to adopt the decision should it choose to do so. There is no statutory presumption that a responder was not grossly negligent in responding to an incident, thus placing the burden of proof on the plaintiffs to prove otherwise. There is also no statutory provision that would require plaintiffs to pay the costs of litigation if they file a frivolous case and lose which would strongly discourage such suits. And lastly, it is unclear whether the court's decision with regard to derivative immunity and preemption will be applied in cases involving smaller spills in which the Federal On-Scene Coordinator take a more passive monitoring role instead of directing all response efforts.

Accordingly, maybe the time is ripe to have the National Academy of Sciences ("NAS") or the U.S. Government Accountability Office (GAO) conduct a study of the issue, including the impact that this district court decision may have on potential future litigation against responders following a spill incident based on these uncertainties.

The Eastern District of Louisiana's decision is a major breakthrough with respect to responder immunity. Hopefully, the remaining plaintiffs will be dismissed in short order once the Motion for Summary Judgment briefing schedule is completed. Once this is completed, it may be time for a NSA or U.S. GAO to conduct a study of the current state of affairs, including the recent court decision and costs/fees associated with defending lawsuits filed by plaintiffs against responders to assess whether more needs to be done to ensure for an immediate and effective response to spills in the future.

Jonathan Waldron *is a Partner at Blank Rome LLC and concentrates his practice in maritime, international, and environmental law, including maritime security. Mr. Waldron is a visiting professor at the Massachusetts Maritime Academy where he teaches on legal issues related to pollution response and spill management teams. He is a member of the Maritime Law Association and frequently speaks and writes on maritime issues.*

The Future of Shortsea Shipping and Domestic 'Markets'

Bob Kunkel asks:
Can Domestic Shipping Become Our Industry's Farmer's Market?

By Robert Kunkel

Arriving at the Farmer's Market this morning I made the decision to grill some hand cut rib eye with fresh vegetables and potatoes later that evening. I searched several of the local farm kiosks to find the mix I wanted and then reached into my pocket to pay for my choices. The price for all this local fare is not competitive with Cosco or Walmart, but I know the vegetables are organically grown without chemicals and the local beef is grass fed. The price point may not be right but the effort supports local business and the farmers who work hard to provide us sustainable products and quality.

Why not follow that thought process to create the future of domestic shipping?

The Jones Act Discussions

The Jones Act 'debates' were alive and well the first quarter of 2016. Low energy prices, U.S crude export, the age of U.S. domestic container vessels and the falling levels of period charters in the medium range tanker market fueled new media reports. As a result, the fortune tellers gazed into their crystal balls to determine how the current set of down markets can or will affect future growth in our domestic trades.

Kinder Morgan, now reportedly ranked as the highest profile Jones Act fleet tanker build out of the decade with eight MRs on the water and eight newbuilds in various stages of construction and delivery, recently looked to sell a 50% stake in their domestic fleet operation. The fortune tellers are eager to report a new valuation point based upon the offers received. Considering the current spread between a Korean built 50,000 deadweight product tanker and the same design (built U.S.), it obvious that we build to the market.

There is no doubt the fall of energy prices and the export of U.S. crude has affected the domestic tanker market. Where reports of $115,000 per day period charter rates fueled new building contracts and a rush to provide MR capacity for crude movements Gulf to Northeast some years ago, few remember that the market was $45,000 per day when the first NASSCO deliveries and the American Phoenix were under construction not two years before that. The current market today hovers around $60,000 to

Credit: Crowley Maritime

Crowley Maritime Corp. recently took delivery of Louisiana, the third of four new, Jones Act product tankers being built for the company by Philly Shipyard, Inc. (PSI). These tankers are at the forefront of the industry for their potential future conversion to LNG propulsion.

$65,000 per day for a long term, major oil backed charter. This is a significant drop from the market peak we saw not more than eighteen months ago at $75,000 to $80,000 per day. Though many want to speak to the domestic trades being 'protected,' the fact is that nothing protects the owner or the operator from the cyclical nature of shipping.

The Offshore market is no different. Many historical owners and operators contracted for OSVs, PSVs and Offshore construction vessels to support deep offshore drilling in the U.S Gulf. Most, if not all have stopped construction and placed new tonnage into layup. The down cycle of this market is a sad story today as many have lost jobs in the shipyards and in

U.S. shipbuilding and a small sector of domestic operators have already embraced the sustainability model by building the first LNG propelled container ships and LNG bunker barges. Environmental considerations took precedent in those decisions and they should be recognized for that effort.

Credit: Crowley Maritime

the U.S. Gulf as a result of the downturn.

The cyclical nature in both of these markets is nothing new. Offshore tonnage has been in and out of layup for decades. U.S. shipbuilding has seen either feast or famine because of it. The problem is not only domestic, the cycles exist internationally and we have seen a disaster in the dry bulk trades due to over building coupled with China's economic downturn in recent months. One of the major differences in the business is that the international owner and operators are afforded several means to recover. In an upscale market there is a windfall opportunity to sell your second hand tonnage for a profitable return. In a downscale market, there is an exit strategy to also sell your tonnage and stop the losses when the downfall occurs. The price to build U.S. Flag ships and operate domestic tonnage does not afford U.S. owners those opportunities.

That resale inability and the absence of an exit strategy force many owners to operate domestic tonnage well beyond an age usually acceptable in the international trades. U.S. built replacement tonnage is expensive and becomes difficult to support in a cyclical market when first delivered. That issue has also entered into the Jones Act debate early this year with a vessel lost in the Puerto Rico trade and an investigation entering mainstream media. The age of the vessel has been raised despite the fact that she was properly inspected, by the U.S. Coast Guard and Class and operated by competent officers, crew and managers. To question the condition of the vessel now, is a travesty and is disrespectful to those who lost their lives in the accident. The accusation disrupts the entire theory and application of ISM, Class and Flag survey.

Look Ahead

The age of the Jones Act fleet has never been a secret. The cost to build U.S. in comparison to the foreign shipyards has also been the subject of debate for years. Technical sustainability at an economical cost is what needs to be developed in the domestic fleet and recent regulations, environmental issues and ship design may provide an opportunity to close the gap and end the debate.

The U.S. shipbuilding industry needs to support U.S. manufacturing if we are ever to become competitive in a shipbuilding market. As Amtech, we also build in Korea and the yards support hundreds of local businesses during the construction. In fact, the shipyard in most cases is the lifeblood of the city and those local merchants. Nearly all of the equipment utilized in U.S. 'bluewater shipbuilding' is purchased and shipped from Asia and Europe at a cost well above what the foreign yards pay. Logistical costs, Custom duties, and service support contribute to those higher build costs. Look at past examples. When the global fleet advanced from steam propulsion to large two-stroke diesel engines, no U.S. manufacturer was successful in developing major propulsion systems. All of our propulsion systems in recent deliveries are Korean or Chinese built.

We still trade on steamships in several non-contiguous trades and only recently has the Lakes fleet started major propulsion refits. Why? The vessels cannot meet the regulatory standards of emissions and the time has come to make the change. The new regulation has disrupted the business.

The EPA now requires a TIER 4 engine rating with regard to stack emissions. During a recent large ATB project we completed, only one engine set for the tugboat could

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Credit: Bouchard Transportation

Bouchard Transportation is the largest flat-deck double-hull petroleum barge company in the United States.

meet those standards and a U.S. manufacturer built it. The General Electric V250 may be a medium speed engine, but it has become a domestic market leader due to environmental sustainability issues and we should learn from that lesson. This engine package will not be boxed up and shipped across the Pacific.

Ballast Water treatment is another example. The IMO regulations have been pending for twelve years and four years have passed since the U.S. Coast Guard provided their guidelines. Few, if any owners comply, as of the January 1, 2016 date mostly due to mass confusion. The cost to purchase and install the units has in many cases been quoted well above $1 million. Considering that we are a 'domestic fleet,' has anyone asked what invasive species we are protecting ourselves from on a voyage between Houston and Tampa? Does the international regulation apply to our domestic movements or is this a $1 million dollar cost savings in our construction?

Most see the environmental requirements as disruptive to historical business models. The latest discussions in Europe have looked to define the new challenges as 'disruptive sustainability' with the belief that shipping will need to face future innovations that will go beyond the aspects of current financial engineering.

Embracing Domestic Sustainability

U.S. shipbuilding and a small sector of domestic operators have already embraced the sustainability model by building the first LNG propelled container ships and LNG bunker barges. Environmental considerations took precedent in those decisions and they should be recognized for that effort. We need to continue this path in our shipbuilding practices and move away from generic designs and machinery that will be obsolete within the next decade. The tag is correct. It is 'disruptive' to current operations and with that said we should recognize that we could create a local sustainable marketplace. No different than organic agriculture creating its farmer's markets to move and sell fresh quality product priced above the large box stores.

In a digital world, the introduction of innovative technology is a daily function of social media and Internet activity. The future of shipping is discussed everyday within Amazon, Facebook and Instagram. Rolls Royce and Wartsila design departments are introducing unmanned platforms working off of data provided by current AIS systems and long range traffic centers to move autonomous transport forward. Battery technology, gas technology, fuel cell technology – all theoretical applications ten years ago in automotive and aircraft design – is now being applied to all form of transport including shipping.

Scandlines has christened their newest hybrid ferry, the M/V Berlin as part of ambitious environmental strategy. A hybrid propulsion system powered by a Corvus Energy ESS (Energy Storage System) is capable of producing 6000 kW or nearly half of the diesel electric propulsion system design of 15,500 kW. This is their fifth Hybrid delivery. More Hybrid applications will come.

New technology and a Farmer's Market mentality is our path forward. Build quality and innovation. The Jones Act debate is a tireless loop and the domestic fleet will not be a continuous series build nor should it be a rush to an overstated market and or be marketed to provide military comfort. The speed of technological information will no longer allow ships operating on our coasts that are 30 to 40 years of age. Be disruptive, look towards sustainability and understand the costs associated with that environmental strategy. We can be competitive in that market.

Be local, ship local, buy local – that is domestic shipping. That is our Farmer's market.

Robert Kunkel, President of Alternative Marine Technologies, previously served as the Federal Chairman of the Short Sea Shipping Cooperative Program under the Maritime Administration and the USDOT from 2003 until 2008. A past Vice President of the Connecticut Maritime Association, he is a contributing writer for MarineNews. A graduate of the Massachusetts Maritime Academy, Kunkel sailed as a licensed engineer and continued his career in ship construction at NASSCO and Hyundai Heavy Industries, among others. He is a senior member of the Special Committee on Ship Operation with ABS and an elected member of the NCB.

Vigorously Vying for Overseas Opportunities

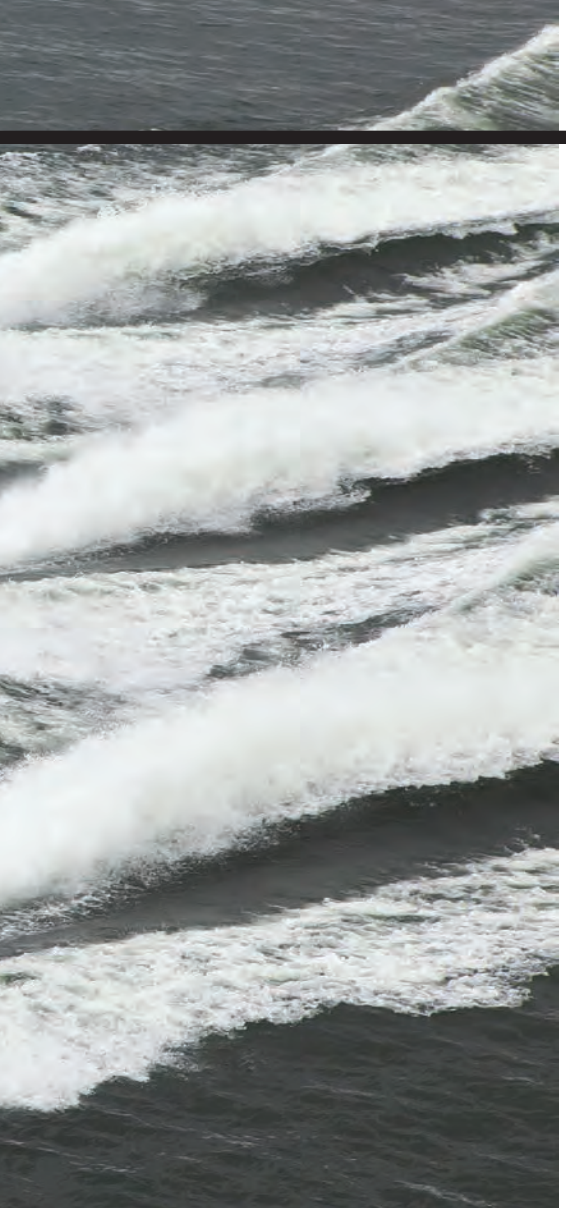
Credit: John Fleck

An increasingly diverse Vigor Industrial looks beyond the domestic malaise in the government and military small boat sectors for the low hanging fruit that awaits elsewhere.

By Joseph Keefe

Leveraging the combined weight of an already considerable manufacturing base and its two newest acquisitions – Kvichak Marine Industries and Oregon Iron Works – Vigor Industrial is quietly eyeing the overseas combat and patrol craft market. Acting not only as a balance against a waning domestic military small boat market, Vigor also sees potentially rich opportunities with Middle East entities who will likely see great need for this type of littoral craft in the future. And, while Vigor hasn't bet the whole store on the effort, the weight of the combined assets represented by Vigor, OIW and Kvichak are fully behind the push.

The acquisition of Kvichak (2015) and before that, Oregon Iron Works (2014) has quietly positioned Vigor to vie in the fiercely competitive government patrol and combat markets, combining the experience of both and the economy of scale of a state-of-the art metal processing facility in South Seattle. Today, the old OIW and Kvichak are collaborating under the Vigor Banner, sharing design and engineering resources, product development and marketing resources, and each performs production and fabrication support for one another. Kvichak has been around for 35 years and Oregon Iron Works since 1944. Vigor's Executive Vice President of Business Development, Keith



Whittemore, says without apology, "If you can't beat 'em, join em. I always wanted to get into Oregon Iron Works' market."

Utilizing bar codes, waterjets and lasers in their south Seattle building, all pre-fabrication work for the small boat line is accomplished. Whittemore says Vigor's facility is second to none. "There is no other metal processing facility like it in the United States. We scan inventory parts in and out with a barcode system, he said, adding, "Now, production and engineering are all under one roof to tackle these markets."

But, as the market for government hulls begins to slow here in the United States, it is beginning to pick up

Keith Whittemore,
Executive VP, Business Development

elsewhere. Nowhere is that more true than in the Middle East, where regional conflicts persist in a half dozen places, and additional hot spots flare daily. As it turns out, Vigor is already there. Whittemore explains, "Vigor Kvichak has been very interested in foreign military markets for many years. The U.S. market share is saturated – there's only so much market share here to get. Kvichak has a bunch of it, but if we want to expand, then we need to be marketing overseas."

Foreign Experience = Overseas Opportunities

Vigor is putting its money where its mouth is. Whittemore has been to trade shows all over the Middle East, demonstrating their latest boats and visiting virtually every country in the region in the process. The $2.5 million boat – a 45' RB-M 'Vigilant' – is based in Bahrain, and at no small cost. Vigor maintains a local captain, a Middle East Manager, and local support for the operation. In place long before Kvichak's merger with Vigor, Whittemore says that the boat represents their firm commitment to this market.

"We didn't want to be the carpet baggers with pictures and videos – you have to prove to them what you do. The reason we built our demo boat (Vigilant) is that we wanted to give the boat to the local agencies, and have them tell us how it operated in their missions instead of us telling them how great it would be." In effect, Vigor Kvichak gives the prospective clients the keys to the boat for two weeks and says, 'Give it back to us full when you're done.' Whittemore told *MarineNews* in May, "Testing our demo boat proved that it works quite well for the missions of the GCC. Kvichak is monitoring over 600 data points – cabin temperature, oil pressure, you name it – on the boat via Intranet, downloading to Seattle regularly to confirm that the boat is operating correctly. We build the right products, and we expect them to work."

The Middle East has proven to be the perfect – if not excessively brutal – environment in which to test drive the equipment. Whittemore adds, "It's hot, it's sandy – it's a really vicious environment. For example, in this arena, you need twice the A/C. Standard gaskets not enough, air intakes and paint all have to be carefully considered."

This isn't Vigor Kvichak's first rodeo in the foreign markets; nor is it Oregon Iron Works. Oregon Ironworks (now Vigor) has previously exported to Israel, for example. For its part, the Kvichak side of the equation has been selling oil skimmers all over the world for 25 years. Here at home, the U.S. Navy owns 50 of those skimmers. Beyond these shores, Whittemore says the skimmers are in operation in places like Brazil, Poland, Russia, Australia and Mexico. Whittemore also points to Vigor Kvichak's experience in the pilot boat markets. "We have export experience – this isn't something new to us. One of our first significant export projects for Kvichak involved the production and delivery of three 22 meter pilot boats for Dutch pilots in Rotterdam and Amsterdam. These are semi-governmental agencies and for the Dutch to go outside Holland for these hulls – especially the U.S. – was a big deal." He adds, "We gave them the boat they wanted – not a stock hull or pre-designed form."

Beyond Kvichak's success in the

The RB-M Commercial at a glance ...

Designer: Camarc Design	Fuel capacity: 495 gallons	Main engines: (2) MTU series 60 (825 BHP)
LOA: 44'11"(13.6m)	Construction: All-Aluminum	Marine gears: Twin Disc MG5114SC
Beam: 14'7"(4.4m)	Top speed: >40 knots	Waterjets: Rolls Royce
Draft (RFS): 3.0' (0.9m)	Generator: Kohler 9kW	Generator: Kohler 9kW

skimmer markets, Pilot Boats have also been delivered to the Middle East (Oman), Survey Vessels to South America and Commercial Fishing Vessels to Russia.

While Vigor's efforts in the Middle East have not yet yielded as many sales as we would like, we have learned a lot. For example, the time frame and costs of doing business in the overseas are about three times what they are here in the US. If you are going to play in this market, you better have a lot of patience and significant money to invest." He added, "Some of our products can be sold now, but it will be another year or so for others to come to fruition because the U.S. Navy is our number one customer and absolute priority. When they're happy, then we will deliver to other customers."

Back at Home

Vigor's Kvichak / OIW business plan calls for spreading the business around; with the Vigor/Kvichak model calling for 50% military and 50% commercial production, while the Vigor/OIW model produces 85% military and 15% commercial hulls. The individual markets served are many, including Patrol Vessels, Oil Spill Response vessels, Excursion Vessels, Fast Ferry Boats, Pilot Boats, Hovercrafts and Survey Vessels. "With that business plan," says Whittemore, "We like to operate in 6 or 7 market places, foreign and domestic, using the same style of engineering."

On another front, also contracting to the U.S. Navy, Vigor/OIW's Sealion project is highly secretive, but in a nutshell, the Sealion Craft is a 71' all-aluminum, high-speed planning vessel for littoral operation. Unique features include advanced geometry and precision boundaries for low signature operation. Vigor/OIW has so far delivered two Sealions to the U.S. Navy.

While Vigor/OIW is more heavily invested on the military side of the production equation, that's not to say that Kvichak hasn't been active there, as well. For example, and in conjunction with Marinette, Kvichak previously helped deliver 174 RB-M boats to the U.S. Coast Guard. The RB-M is a pure all weather, patrol, search and rescue vessel. Marinette managed the contract while Kvichak did the design and engineering work. Production of the boats was split between both parties and Whittemore reports, "It was a very successful project for all parties, including the customer."

VESSEL SPECIFICATIONS

DESIGN TEAM:	VIGOR MICHAEL PETERS YACHT DESIGN LEIDOS
BUILDER:	VIGOR, CLACKAMAS, OREGON USA
CONSTRUCTION:	ALUMINUM
LOA (HULL):	60' 7"
BEAM OVERALL:	13' 2"
DRAFT:	3' 5"
FULL LOAD DISPLACEMENT:	59,600LBS
PAYLOAD (4 CREW, 19 PASSENGER, GEAR):	10,000LBS
ENGINES:	(2) MTU 8V2000 M94 1250HP EA @ 2450 RPM
DRIVES:	(2) ZF SEA REX 120S
FUEL CAPACITY:	1360 GALLONS
TOP SPEED:	52 KNOTS
CRUISE SPEED:	40 KNOTS
RANGE (CRUISE), 4' COMBINED SEAS:	600 N. MI.

The Combatant Craft, Medium

The CCM, designed by Michael Peters Yacht Design, replaces another legacy hull in the Navy's tool box, will be used in a variety of roles, mostly probably involving getting special operations troops in and out dangerous environments. Other tasks might entail reconnaissance, anti-terrorism, unconventional warfare and other similar missions. One of the key enhancements of the CCM is its use of shock mitigation seating to better protect its occupants during high speed maneuvers. Early in 2014, Oregon Iron Works was announced as the winner of the CCM contract, and became the sole provider for the 35 boat deal, of which 5 have been so far delivered. According to Whittemore, Vigor has the capability of delivering as many as 10 of these craft annually.

A Balanced Formula

Comfortable at home selling into both government and commercial sectors, Vigor's business plan also proves that U.S. builders – in niche markets – can compete overseas. Already a proven provider of military grade workboat hulls to domestic governments – municipal and federal alike – Vigor now looks to leverage its considerable foreign export signature in the same markets overseas. As the U.S. market for this kind of hull softens, Vigor's Middle East footprint is just one of many places they have looked to place their hulls outside the country.

As ***MarineNews*** went to press, the Office of Management and Budget (OMB) completed its review of the draft final rule entitled *Inspection of Towing Vessels*, also known as "Subchapter M." That's nominally good news for shipyards, especially ones in the smaller, workboat space. But, in this challenging climate of low price oil, that relief will take a while to ramp

up. In the meantime, those yards with a more diverse backlog portfolio are likely to be the best candidates to not only survive the down times, but also prosper in the good to come.

Already experienced in foreign sales, commercial and government alike, Vigor today, leveraging its newest boatbuilding acquisitions, is looking to the overseas markets to keep its hand in the game. The effort, balanced against a healthy domestic backlog, is just what Vigor Executive VP of Business Development Keith Whittemore has in mind. So far, it has been a winning strategy.

Vigor Industrial at a Glance ...

Headquarters: Portland, Oregon	***2010:*** Purchased Marine Industries Northwest (MINI) in Tacoma
Employees: 2,500 (+/- 550 in the Kvichak/ OIW space)	***2011:*** Purchased Todd Pacific's operations
Business Locations: 12	***2012:*** Acquired Alaska Ship & Drydock in Ketchikan, AK
President: Frank Foti	***2014:*** Acquired Oregon Iron Works
Founded: 1995 (Vigor name established 2000)	***2015:*** Acquired Kvichak Marine Industries

Hybrid Technology for Military and Commercial Vessels

The Hour of Power Comes of Age.

By John Haynes

The marine industry is now recognizing the potential of utilizing hybrid power and innovative propulsion systems. Certain maritime sectors are potentially well suited to hybrid systems. These include ferries, pilot boats and workboats that have relatively consistent duty cycles. For military applications, hybrid systems are relevant for patrol, intercept and autonomous vessel duties.

Submarines have utilized batteries and stored energy for many years. Diesel/electric systems have long been in use, but these are not hybrid systems. The diesel/electric vessel uses its engines to connect directly to an electrical generator; the power in the system is then transferred electrically to the propeller shaft via a motor controller and electric motor. The system may have multiple generators and multiple motors, but until recently there was no storage of electric energy.

Emissions and the Balance of Power

On 1 January 2015, Emission Control Areas (ECA) came into effect for the USA, Canada, the North Sea and the Baltic. Separately, China has voluntarily imposed ECAs in effort to reduce pollution. Options to reduce emissions include exhaust cleaning 'scrubbers.' Operators that infrequently visit ECAs may make a commercial decision that it is cheaper to be fined than to comply, but this is not a viable option for ferries and cruise ships on a regular port rotation.

The traditional operating model for shipping is to moving goods from point-to-point quickly. Slow steaming is introduced in order to lower costs by reducing fuel consumption. The requirement for 'power' is also changing for many professional small craft operations. As new technologies evolve, objectives more important than pure speed include power trains that do not fail, redundancy, extended operat-

WFSV 'Seacat Intrepid' built by Alicat – South Boats IOW. Deck layout includes space for ISO containers.

ing range, reduced costs, fuel economy and environmental compliance.

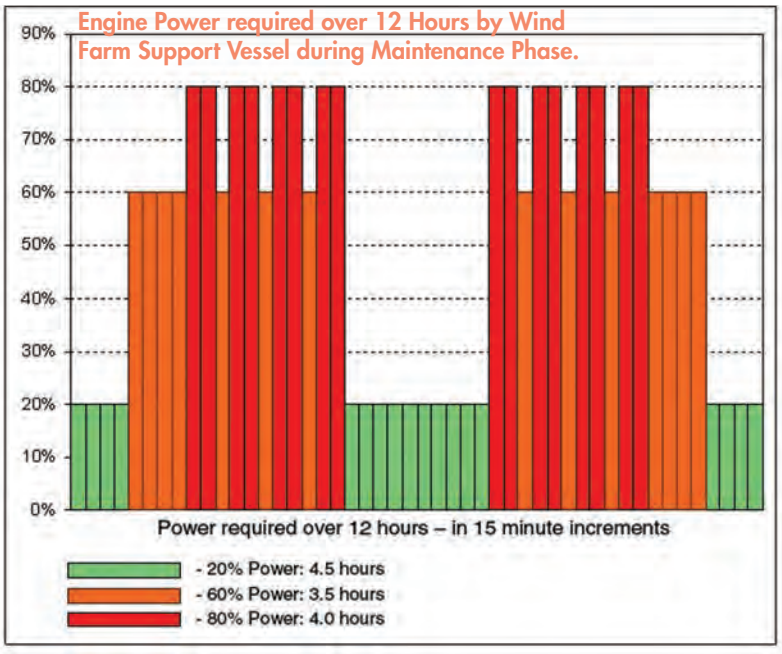
The professional workboat sector is also entering a period of rapid change and commercial opportunity. Boat builders, engine manufacturers, technology designers and naval architects are now developing hybrid systems for pilot boats, tugs, survey vessels, patrol vessels, yacht tenders and unmanned craft. All of the benefits that appeal to shipping also apply here.

Hybrid systems are not a 'one size fits all' proposition. To that end, a consistent process of quantifying operating conditions helps to identify which duty cycles are hybrid solutions candidates and, indeed, first adopters. With vessel life cycles of over 20 years, naval architects and builders of new craft will offer designs that have space and access routes to enable retrofit of hybrid installations. Today's focus is on the sub IMO/80 feet (24 meter) workboat sectors.

Green Energy provides Military Power

For military applications, hybrid systems give patrol vessels the ability to turn off their main engines to loiter silently on station at sea with a low heat signature. Training exercises and maneuvers that require command and control from slow moving or stationary vessels could utilize stored energy from high energy battery systems. Patrol vessels will still use their main engines to move rapidly from point to point. Once in position, a vessel can patrol slowly on battery electric power. This will be particularly relevant to vessels undertaking port or estuary patrols at low speeds. Stealth and the element of surprise have many applications for customs, border, riverine and

Modular ISO Container System. Includes battery modules, electrical panels & thermal management.



fisheries protection. For specialist operations, boat teams could utilize stored energy to approach the target in silence. Once the energy is on board, engine designers could also configure the main engines to use extra kilowatts of battery power to create increased top speed for short bursts.

As requirements grow for 24/7 security in ports and waterways, Unmanned Surface Vehicles (USV) will be considered for various roles and the drivers for rapid technology development are significant. As no crew changes are required, USVs can remain at sea for days at a time. As diesel engines were not designed for 'start- stop' operation, hybrid systems that enable USVs to use stored energy will be a viable solution.

Batteries can be initially charged from shore power or mother vessel. During missions, batteries can receive their main charge from a diesel generator, with a secondary charge from solar power. In the near future, alternative sources of energy, including wave action, will provide free sustainable energy sources that can be utilized to sustain unmanned vessels for extended durations at sea.

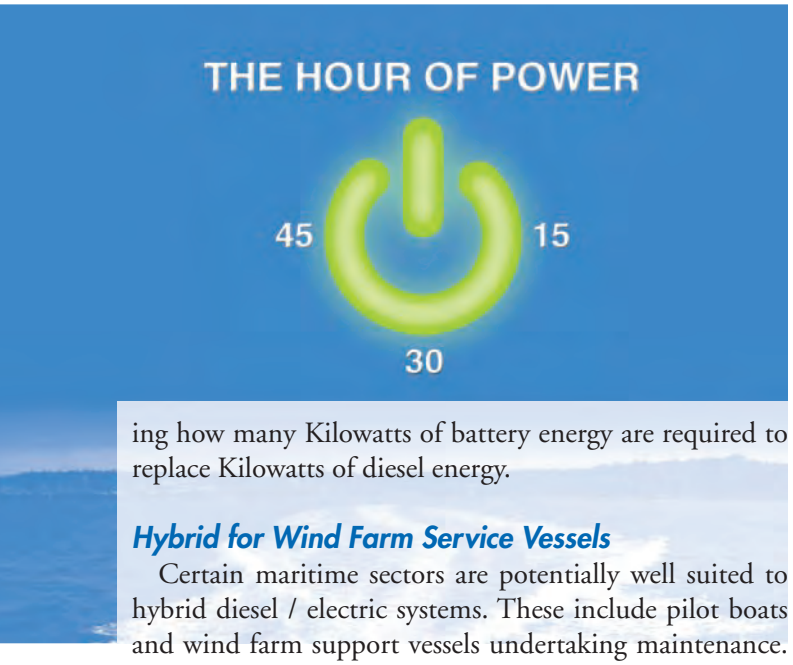
The Hour of Power

The Hour Of Power is a hybrid concept using a combination of diesel/electric/battery that enables a vessel to use conventional diesel engines and propulsion, charge batteries when running diesels, charge batteries from shore power, run on battery/electric for up to one hour or loiter on battery for significantly longer. The concept enables vessels to run in and out of port for an hour on electric with battery power and then carry out their open sea work on diesel power. The aim of this hybrid solution is to enhance conventional power and propulsion systems. Vessels can reduce emissions and improve fuel consumption, while extending engine maintenance periods and engine life.

The Hour of Power focuses on hybrid solutions linked to viable business cases. This is not green energy for the sake of it. Many commercial harbors around the world have 10 knot speed limits for low wash or safety reasons and are within one hour of sea. For commercial organizations, the simple concept of running vessels with zero emissions shapes decisions that lead to improvements of in-service systems and procurement of next generation vessels. The overall objective is fuel savings and improved efficiency.

There are various methods to determine the most efficient speed for a vessel to travel at on battery/electric power. Naval architects can create vessel-by-vessel models, but identifying how many kilowatts of alternative energy needed can be a simpler task. One of the main criteria that enable battery/electric power to work efficiently is to operate the vessel below both 'hump' speed and 'hull' speed. The start of the hump is beyond the point where the boat exceeds its displacement hull speed.

The hump is clearly defined on the speed / resistance curve for any size of vessel. As speed increases a fuel meter shows fuel consumed, which will significantly increase at the hump. Another source of information is to generate a speed / power curve from the engine management system that shows how many Kilowatts of energy are consumed at a particular speed. For the sake of simple calculation this should be done in zero current and zero wind conditions. Separate allowances can be made for favorable or opposing current and or wind. The main objective is identify-



ing how many Kilowatts of battery energy are required to replace Kilowatts of diesel energy.

Hybrid for Wind Farm Service Vessels

Certain maritime sectors are potentially well suited to hybrid diesel / electric systems. These include pilot boats and wind farm support vessels undertaking maintenance. Both have relatively consistent duty cycles, often running seven days a week, to drop off or collect pilots and technicians. If wind, wave and tidal energy installations are striving for genuine 'green' credentials it is logical to reduce consumption of fossil fuels wherever possible.

A typical working day starts with the WFSV crew preparing the vessel for departure at 06.00. The vessel would be disconnected from shore power which has been used for overnight battery charging. The vessel can leave the dock on battery/electric power, which also means zero emissions. At the outer sea buoy, diesel power takes over for the high speed transit out to the wind farm and to deliver the technicians onto the wind turbines, during which time, batteries are recharging.

Many vessels have hours of waiting in the wind farms, as they are on standby they cannot anchor. Loitering at low speed and low revs is not an efficient load cycle for diesel engines, plus it leads to increased maintenance and reduced engine life. This loitering period could be on battery power. Later in the day, diesel power is used for the high speed transit to port, with the batteries again recharging. At the sea buoy, battery power takes over to enter the harbor, with zero emissions.

Next Generation Cells and Batteries

US battery manufacturer XALT Energy has the experience of taking high voltage battery projects from concept through cell production into the finished system for maritime applications. The company works with builders, naval architects and operators to analyze workboat duty cycles. Robert Young, Technical Lead for Marine Appli-

cations at XALT Energy told *MarineNews*, "Engine management data can be matched to battery characteristics to develop the most efficient solutions. Onboard energy management systems are designed to ensure that battery systems operate at optimum performance. The objective is hybridizing and electrifying marine vessels to produce financial benefits and reduced emissions." XALT designs scaled, modular Lithium-ion battery systems that consider the footprint, weight, cost benefits and safety case for marine applications.

Operators have learned that power and performance are relevant, but reliability and durability are important factors for all types of propulsion. A vessel with battery/electric capability linked to two main engines, one generator and a battery bank has various power options that greatly improve redundancy and 'get home' capability. For example, banks of batteries can be permanently installed in each hull on catamarans. For workboats designed to carry ISO containers, an alternative would be to create portable energy units that could be carried on deck. As many workboats are designed to have modular payloads this would enable containers to be moved between vessels as changing duty cycles, or contracts with green credentials, require alternative energy on board.

The Hybrid Future

The IMO Energy Efficiency Design Index (EEDI) aims to reduce emissions from large ships by 30% between 2014 and 2025. Countries developing new green energy policies may want to enter the offshore wind, tidal and wave energy sectors by specifying vessels that harmonize with the global reduction in the use of fossil fuels. Class rules, safety, performance and cost are relevant to naval architects when considering innovative battery power and diesel electric propulsion systems. The challenge for designers is to engineer solutions utilizing hybrid technology which are both practical and affordable.

As new sources of energy become available it is important to identify which energy source best fits the vessel, duty cycle and environment to give efficient power when it is needed. Since no two vessels, routes or captains are alike, decisions can be improved with data logging and analysis. Commercial off the shelf power management systems will ultimately bring together all components with 'big data' solutions to create optimized whole vessel hybrid systems. As other sectors – ashore and afloat – move rapidly towards hybrid solutions, commercial and military small craft will do the same. How that plays out will make all the difference.

John Haynes *is an Associate Fellow of the Nautical Institute, a Yachtmaster Ocean and Advanced Powerboat Instructor. Subject matter expertise includes high speed craft consultancy, product development and specialist training. He is Operations Director of Shock Mitigation, providing WBV Awareness training* ***www.shockmitigation.com*** *and founder of the RIB & High Speed Craft Directory* ***www.ribandhsc.com***

Fire Boom Performance in the Gulf of Mexico Oil Spill

On April 20, 2010, the Deepwater Horizon mobile offshore drilling platform was destroyed as a result of a catastrophic blowout of the Macondo 252 well in the Gulf of Mexico. The blowout resulted in a continuous discharge of approximately 3.19 million barrels of oil over three months covering approximately 30,000 square miles of the Gulf. It was the worst accidental oil spill in U.S. history.

Due to the massive amount of oil being spewed into the Gulf, three aggressive oil removal methods were authorized: mechanical skimming, dispersant application and controlled burns. Controlled combustion – "in-place," or in-situ burning (ISB), proved to have the most impressive oil elimination rate. Over the course of the spill, 411 controlled burns were conducted removing over 300,000 barrels of oil from the surface.

Typically, there are two types of fire containment boom: actively-cooled booms made with water-wicking or absorbing material or auxiliary coolants and booms made of fire-resistant materials such as ceramics and steel. Five brands of fire boom were deployed in the Gulf Spill ISB operation. Among them were two Elastec systems: the Hydro-Fire Boom and the American Fireboom.

Boom Performance

According to an independent fire boom evaluation report by BP America, the ELASTEC Hydro-Fire Boom systems "collected the most oil and were responsible for the highest volume of oil burns per system." The Hydro-Fire Boom's patented water-cooled design increased its staying power resulting in some burns lasting nearly 12 hours in duration. ELASTEC American Fireboom was the second most successful fire boom utilized. The American Fireboom, made of ceramics and steel, was originally developed by the 3M Company and refined by Elastec. It too survived burns lasting nearly 12 hours in duration.

The BP evaluation report concluded that, "Booms with ceramic floatation systems became less capable of retaining oil with each burn. But, an interesting observation was that the [ELASTEC] American Fireboom developed a build-up of oil residue that would impregnate the fire resistant fabric. This would enhance the oil holding properties of the boom and increase the number of times it could be used. This probably extended its containment capability and allowed for more burning time. The [second generation] versions of the American Fireboom systems proved to be reliable as well and allowed multiple burns. In general, non-water-cooled or dry fabric booms suffered more than water-cooled booms when exposed to wave action following a burn. The more flexible American Fireboom fared better than others in this respect."

Some dry-fabric fire boom systems performed admirably, although they could not match the endurance or the retention capability of the water-cooled ELASTEC Hydro-Fire Boom. Fire boom performance data from the BP evaluation report are summarized in the accompanying table.

The BP report also states, "The data speaks for itself. This report should make it clear that the success of a fire boom is not only determined by its capability to contain oil and maintain a large fire; it must also sustain its oil containment capability and endure the constant fatigue stresses imposed by the varying wind and wave action. Effective fire boom must also retain its structural and thermal integrity while deployed for burning, and while on the water, waiting for the next burn."

In-situ burning has some of the same limitations involved with mechanical recovery and dispersant application. These may include high wind and sea conditions, visibility and the nature and distribution of the oil. Controlled burning, under a broad range of environmental conditions (tropic, temperate or arctic) almost always removes oil much faster and more efficiently than other response options. Burning also eliminates the need for on-site storage of recovered oil and the transfer of such fluids to shore or backup storage vessels. A comparison of the costs of mechanical removal, dispersant application and controlled burning reveals that ISB is almost always less expensive than other response methods.

Elastec President Jeff Cantrell monitors Hydro Fire Boom performance in the Gulf.

Air Emissions

During the ISB operation in the Gulf, large smoke plumes from the burns raised questions about air pollution. Researchers from the NOAA Earth System Research Laboratory (ESRL) and NOAA's Cooperative Institute for Research in Environmental Sciences (CIRES) found that the total mass of organic particles formed from evaporating surface oil was about ten times larger than the total from all of the controlled burns. This meant that the controlled burns were less harmful to the air and the environment (especially in close proximity to any personnel) than if the surface oil had been allowed to spread naturally and evaporate. About one-third of the volume of most crude oils consists of volatile hydrocarbons, many of which are considered toxic, and will evaporate from an unburned oil slick. These volatile hydrocarbons and as much as 95% to 98% of the original volume of oil burned is actually eliminated on location.

Detailed records were taken of each burn during the Deepwater Horizon spill showing that in-situ burning, under the right conditions, is a safe and effective method for the removal of large volumes of spilled oil. In practice, neither burning, chemical dispersants nor mechanical cleanup, used individually or in concert with each other, will ever account for the removal of all oil spilled. No one technique should ever be discounted. In a major spill event, every tool should be considered and used, if safe to do so, for the removal of as much oil as possible. Even if each of these response techniques accounted for only a small percentage of an offshore spill, well-planned and executed response, together with natural degradation processes, would likely keep 50% or more of the oil from reaching shore.

*All photos courtesy Elastec

Insitu Burn Data Summary: Deepwater Horizon Spill

FACTORS	Hydro-Fire® Boom	American Fireboom	PyroBoom	Oil Stop	Kepner
No. of Systems Used	27	37	13	3	2
Longest Continuous Burn	11 hrs 48 min	11 hrs 21 min	3 hrs 13 min	27 min	43 min
Average Maximum Barrels Burned per System	5,173	3,916	1,750	28	296

Fire Boom Performance Evaluation: Controlled Burning During the Deepwater Horizon Spill. BP America.

Al Allen has been a technical advisor and field supervisor involving hundreds of oil spills around the world, including the Deepwater Horizon incident in 2010. A skilled plan writer, field response coordinator, trainer, and expert witness for hundreds of oil industry, government and academic organizations involving more than 75 countries, he is also the author of numerous publications, and holds three patents on specialized spill control systems.

Environmental Compliance and Lubricant Protection

No longer a compromise.

By Iain White

Meeting environmental standards and protecting equipment to the highest standard can result in formulation compromises, especially for products used in some of the most demanding applications. Fortunately, ExxonMobil's Mobil SHC Aware family of high-performance synthetic ester-based oils and greases not only ensure optimum lubricant performance, they achieve this without compromising on protection.

The U.S. Environmental Protection Agency (EPA) Vessel General Permit (VGP) defines controls for discharges from oil-to-sea interfaces on vessels operating within U.S. waters. In order to comply, vessel operators need to use Environmentally Acceptable Lubricants (EALs) in certain applications. However, not all EALs are created equal – those based on synthetic esters offer measurable advantages over other common base stocks.

The EPA regulates discharges incidental to the normal operation of commercial vessels through the VGP. This is a permit issued under the Clean Water Act National Pollutant Discharge Elimination System (NPDES) that controls discharges from vessels greater than 79 feet in length, with some exceptions including Armed Forces vessels. The VGP applies to vessels operating within three nautical miles of the U.S. coast and navigable water in the Great Lakes within U.S. jurisdiction, as defined in Code of Federal Regulations (40 CFR 122.2).

The oil-to-sea interface

Oil-to-sea interfaces include any on-board equipment where seals or surfaces have the potential to release oil into the sea. The VGP specifically identifies a range of equipment that has the potential for lubrication discharge from an oil-to-sea interface. These include:

Controllable pitch propellers	Thrusters & bearings	Stern tubes
Wire ropes and cables	Azimuth thrusters	Stabilizers
Dredges (submersible grabs, etc.)	Propulsion pods	Rudder bearings

Defining the Environmentally Acceptable Lubricant

For these types of applications, the EPA stipulates the use of an EAL. These are defined in the VGP as lubricants that are biodegradable, minimally toxic and are not bioaccumulative. To meet these environmental standards, an oil must meet all three criteria.

Biodegradable: a minimum of 60% biodegradation within 28 days according to OECD 301 B for 90% of the lubricant formulation or 75% of the grease formulation. The finished lubricant may contain up to 10% of components not meeting the 60% threshold of biodegradability and up to 5% of non-biodegradable (but not bioaccumulative) components. For grease, 25% may be either inherently or non-biodegradable (but not bioaccumulative).

Minimally toxic: the finished product must pass the OECD 201, 202 and 203 acute toxicity tests or OECD 210 and OECD 211 for chronic toxicity. As an alternative, an evaluation may be conducted on a constituent basis. If a substance is evaluated for each constituent element, rather than the complete formulation and main compounds, then constituents comprising less than 20 per cent of fluids can have a lethal concentration (LC50) between 10-100 mg/L or a no observed effect concentration (NOEC) between 1-10 mg/L; constituents comprising less than 5 per cent of fluids can have an LC50 between 1-10 mg/L or a NOEC between 0.1-1 mg/L; and constituents comprising less than 1 per cent of fluids can have an LC50 less than 1 mg/L or a NOEC between 0-0.1 mg/L.

Not bioaccumulative: Bioaccumulation occurs when an organism absorbs a toxic substance at a rate greater than the speed at which the substance is lost; the longer the organism is exposed to a chemical and the longer the organism lives, the greater the accumulation of the chemical in its tissues. Consequently, to qualify as non-bioaccumulative a substance must not be able to build up to toxic levels.

For the purposes of the VGP each component of the lubricant formulation that is not biodegradable has to be tested using one of the five designated test methods to demonstrate that it is not bio-accumulative:

- *The partition coefficient in the marine environment is log KOW 7 using test methods OECD 117 and 107*
- *Molecular mass > 800 Daltons*
- *Molecular diameter >1.5 nanometer*
- *BCF or BAF is <100 L/kg, using OECD 305, OCSPP 850.1710 or OCSPP 850.1730, or a field-measured BAF*
- *Polymer with MW fraction below 1,000 g/mol is <1 per cent.*

Choosing an EAL Wisely

Choosing the best EAL is clearly very important and it is therefore essential that workboat operators are aware of the types of products that are available. There are three principal EAL base stock categories:

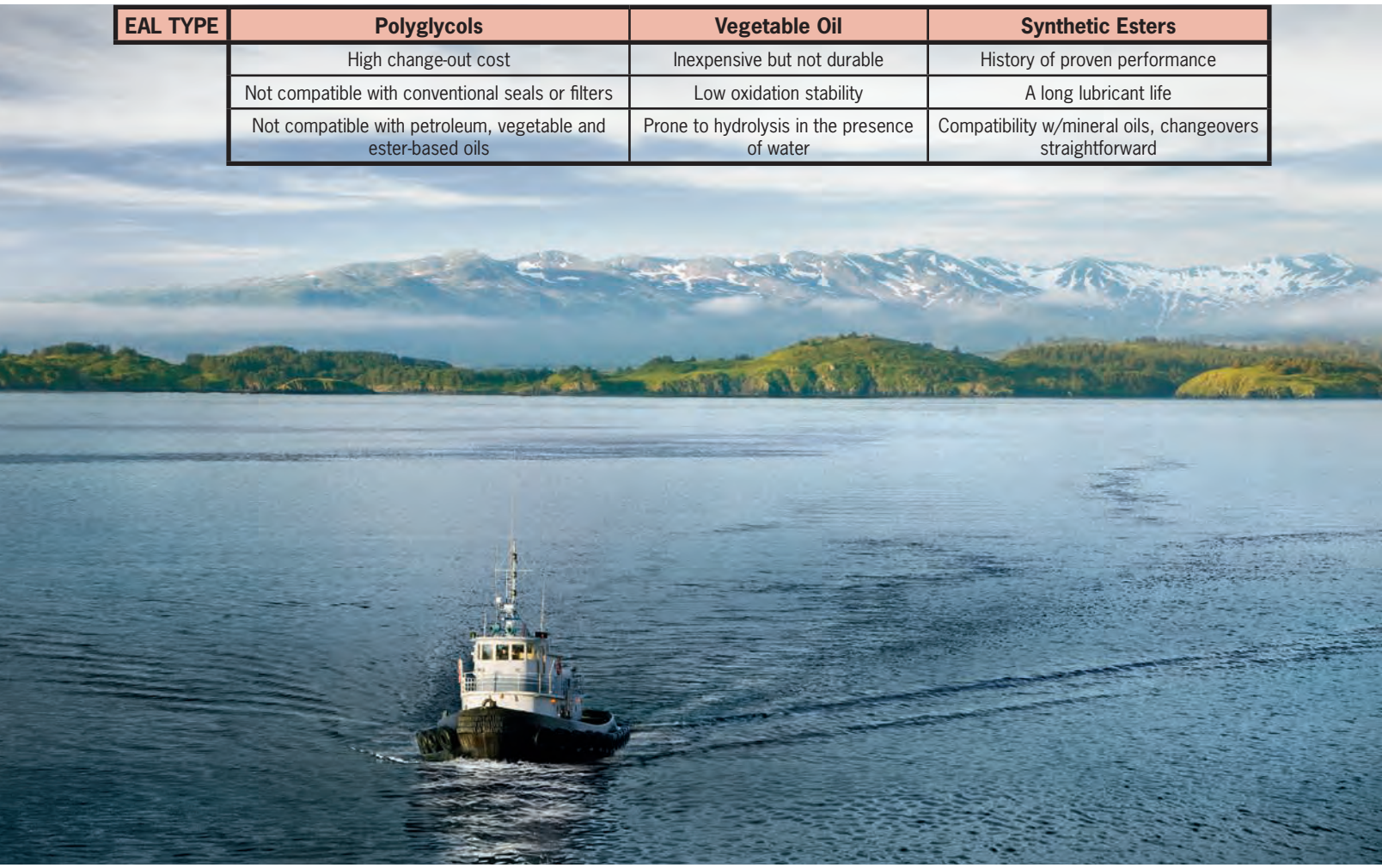
- *Polyglycols*
- *Vegetable Oil*
- *Synthetic Esters*

Polyalkylene glycol (PAG): Depending on the composition, these offer excellent lubricity, good load-bearing characteristics, good low temperature properties, high viscosity indices, good oxidation characteristics, low volatility and hydrolytic stability, as well as high flash points and good biodegradability. They are, however, highly incompatible making change-overs very costly.

Conventional vegetable fluids (Triglycerides): Naturally derived vegetable-based lubricants are readily biodegradable and offer excellent lubricity but are water sensitive due to hydrolysis, a characteristic that make them unsuitable for wet environments. They also have poor resistance to temperature extremes.

Synthetic esters: The most effective EALs are based on synthetic esters. They perform well across a wide range of temperatures, have a high viscosity index, possess good lubricity, provide excellent corrosion protection and have high oxidative stability. They also offer excellent biodegradability and can have good hydrolytic stability depending on the ester. A look at all three options provides a snapshot at the advantages and disadvantages of any one selection:

EAL TYPE	Polyglycols	Vegetable Oil	Synthetic Esters
	High change-out cost	Inexpensive but not durable	History of proven performance
	Not compatible with conventional seals or filters	Low oxidation stability	A long lubricant life
	Not compatible with petroleum, vegetable and ester-based oils	Prone to hydrolysis in the presence of water	Compatibility w/mineral oils, changeovers straightforward



"For these types of applications, the EPA stipulates the use of an EAL. These are defined in the VGP as lubricants that are biodegradable, minimally toxic and are not bioaccumulative. To meet these environmental standards, an oil must meet all three criteria."

– Iain White, Global marketing manager – ExxonMobil Marine

ExxonMobil

Synthetic esters: specific properties

Volatility: The polarity of ester molecules causes them to be attracted to one another and because of this more energy (heat) is required to get them to move from a liquid to a gaseous state. As a result, the synthetic ester lubricants have a high flash point and a low rate of evaporation.

Lubricity: Polarity also causes the ester molecules to be attracted to positively-charged metal surfaces. As a result, the molecules tend to create a film that requires additional energy (load) to wipe it off. The result is high lubricity and low energy consumption in lubricant applications.

Detergency/Dispersancy: The polar nature of esters makes them good solvents and dispersants. This allows the esters to dissolve or disperse oil degradation by-products that might otherwise be deposited as varnish or sludge.

Biodegradability: The character of ester linkage provides vulnerability for microbe to biodegrade the ester molecule. This results in high biodegradability rates for ester lubricants, which enables the formulation of environmentally friendly products.

ExxonMobil's EAL offering

In order to ensure that vessel operators have access to lubricants and greases that not only comply with the VGP but also help to extend equipment life, ExxonMobil has developed the Mobil SHC Aware family of high-performance synthetic ester-based EALs. These include:

Mobil SHC Aware H Series – formulated to provide maximum protection for modern high-pressure hydraulic systems. The oils offer exceptional anti-wear, lubricity and film strength characteristics and are suitable for a range of applications.

Mobil SHC Aware Grease EP 2 – provides an exceptional balance between reducing the potential for environmental damage over conventional products while meeting very demanding performance standards.

Mobil SHC Aware ST Series – these stern tube oils emulsify readily with water and provide outstanding lubrication and rust/corrosion protection with up to 20 per cent water content. Applications include:

Mobil SHC Aware Gear Series – these synthetic gear oils possess outstanding oxidation and thermal properties and maintain excellent fluidity even at low temperatures. Mobil's SHC Aware Gear Series has also secured key equipment manufacturer approvals from thruster manufacturers, including Nakashima, HHI Hyundai and KTE Nakashima Korea.

Conversion from existing mineral oil products to EALs will require time in dry dock for some applications. It is therefore essential that the changeover process is as easy to manage as possible. Vessel operators will want to avoid the need for solvent flushing, as required for Polyglycols, while also ensuring that their EAL is up to the job.

The optimal solution is an EAL based on synthetic esters coupled with EAL-compliant performance additive technology, such as ExxonMobil's SHC Aware family of products. Not all synthetic esters are produced to the same standards but these high-performance lubricants offer best-in-class performance while also being compatible with mineral oils. This not only ensures total compliance with EPA regulations, it also provides minimal downtime while providing the best available overall protection.

Mobil EAL's	SHC Aware H	SHC Aware Grease EP 2	SHC Aware ST	SHC Aware Gear
Uses	Controllable pitch props, stabilizers	Rudder stock	Stern tubes, fin stabilizers	Enclosed gear drives
	Deck equipment	Towing notch interfaces	Controllable pitch props	Heavily loaded gearboxes
	Circulation systems	*Deck grease applications*	*Circulation Systems*	*Rolling element bearings*

MOOSE BOATS' M2-38 WIDE CABIN OIL RESPONSE CATAMARAN

Moose Boats, an aluminum boat builder for military, law enforcement and firefighting applications in Petaluma, CA, is in the final construction stages of a new M2-38 Wide Cabin Oil Response Catamaran for California Department of Fish and Wildlife. The catamaran's 120 square foot cabin is equipped for extended operations hosting four shock mitigating seats, a workstation, galley, dinette and cuddy cabin with a single berth. A large head and shower enclosure is integrated into the cockpit and externally accessed from the recessed cockpit. The M2's bow is equipped with a heavy-duty push knee and the foredeck is configured with handrails to assist Game Wardens with boarding other vessels for inspection purposes. The large jet guard/swim grid is equipped with a custom integrated flush mounting dive ladder, crew safety rails and an electric pot-hauler.

With the now highly competitive federal grant funding opportunities holding individual project value caps under $1M, most agencies seeking new vessels pursue a multi-mission platform. In essence, when a grant for a new vessel is awarded, the recipient agency is motivated to equip the boat to perform as many duties as are foreseeable during its service life. The challenge for the agency, and the vessel builder, lies in ensuring that the craft to be delivered addresses all of the criteria without considerable operational compromise or exceeding the budget.

California Department of Fish and Wildlife Captain, Todd Ajari, commented on the new addition to their fleet, saying, "The new M2 will bolster CDFW's oil spill response and prevention efforts by serving as a swift, high-tech platform for on-water enforcement. First responders on the M2 can better investigate incidents and conduct oiled wildlife recovery operations, using the vessel as its own command center during coordinated response efforts. The M2 will also help ramp up security patrols, provide a dignitary and media platform, aid in equipment and personnel deployment, serve as a training platform, and facilitate fuel transfer inspections and ship documentation compliance checks."

Moose Boats M2 Wide Cabin catamarans have been chosen by several agencies as a capable platform with considerable deck and cabin space to accommodate the required personnel and equipment. A single M2 catamaran can be configured for a host of duties including patrol, search and rescue, personnel transport, firefighting, CBRN detection, side scan sonar monitoring, patient care, dive and multi-day command operations while still remaining under the $1M cap, and without detriment to its core role as a response craft.

Propulsion is provided by twin 425hp turbo diesel engines coupled to water-jets and a 6kW diesel generator supports larger electrical loads such as reverse-cycle air conditioning. CDFW's new M2-38 is another prime example of the versatility and load capacity of Moose Boats catamarans. The M2-38 is simple to handle for daily patrol and work duties with additional cabin space and features to serve as a command or multi-day vessel as required. The new vessel will be delivered to CDFW in Richmond, California in August, 2016.

M2-38 Wide Cabin Oil Response Catamaran at a glance …

LOA: 38' – 10"	Deadrise (aft): 15°	Engines: Twin 425hp Cummins QSB6.7L
LWL: 30' – 06"	Draft: 24"	Propulsion: Hamilton Jet HJ292
Beam: 13' – 06"	Max. Speed: 35 KT	Marine Gear: Twin Disc MG 5075
Displacement: 21,000 lb.	Cruise Speed: 30 KT	Seating: Shox 2000
Fuel Capacity: 300 gallons	Range: 240 NM	Generator: Northern Lights
A/C: Dometic 27kBtu/hr	Radios: Motorola/Icom	Furuno TZtouch Nav

Jensen Maritime Designs New Tractor Tug Meeting Tier IV Emissions Standards

Jensen Maritime has designed a new high performance tractor tug for Vessel Chartering LLC that features some of the first Tier IV engines meeting higher federal air emissions standards among U.S. tugboats. The multipurpose tractor tug, which is being built by JT Marine of Vancouver, Wash., was jointly developed by Vessel Chartering LLC and Jensen. The 110-foot long vessel will feature the ship assist and escort capabilities of smaller harbor tugs, while delivering the improved towing performance and increased range of larger ocean-going tugs. The escort capability was enhanced to provide support for assisting large, 18,000 TEU containerships due to an increased future demand in West Coast ports of call. The design offers the flexibility to support ship escorts, assists and towing. The engines are designed to meet the federal Tier IV standard, which incorporate the emissions-reducing performance requirements by the U.S. Environmental Protection Agency (EPA). To meet the requirements, the two engines on this vessel use systems that clean exhaust gases after they have left the engines. The tug is planned for delivery in the second quarter of 2017 to Vessel Chartering LLC., a wholly owned division of Baydelta Navigation Ltd.

At a glance...

Beam: 40 ft	Engines: (2) 3,385-hp Caterpillar 3516 Tier IV	Tow Winch: Rapp USA
LOA: 110 ft	Electric Hawser Winch: Markey Machinery	Urea: 4,500 gallons
Crew: 10	Fuel Capacity: 123,000 gallons	Designer: Jensen Maritime

Shell Deploys Third GoM LNG-Powered OSV

Shell Offshore has deployed the third Liquefied Natural Gas (LNG) powered Offshore Supply Vessel (OSV) in Port Fourchon, Louisiana. The 'Harvey Liberty,' chartered from specialist company Harvey Gulf International Marine, will join her sister ships, the 'Harvey Energy' and 'Harvey Power', and support Shell's deep-water operations in the Gulf of Mexico. "This is an important milestone for Shell and Harvey Gulf," said Tahir Faruqui, Shell's General Manager LNG North America. "The 'Harvey Liberty' highlights our efforts to grow LNG as a fuel in the transport sector, and is a welcome addition to our portfolio." The 'Harvey Liberty' runs on 99% LNG fuel and can operate for up to 15 days before refueling. The LNG powered vessels provide vessel owners an alternative fuel to meet sulphur and nitrogen oxide emissions regulations in the North American Emission Control Area (ECA).

The 'Harvey Liberty' is 302 feet long and operates on three dual-fuel Wärtsilä engines. It will load from Harvey Gulf's new LNG bunkering facility in Port Fourchon, Louisiana where it will support Shell's platforms in the Gulf of Mexico, transporting supplies, equipment, and drilling fluids. The 'Harvey Liberty' was built by the Gulf Coast Shipyard in Mississippi. All three vessels meet the stringent requirements of the ABS "ENVIRO+, Green Passport" notation, making them some of the most environmentally friendly Offshore Supply Vessels in Gulf of Mexico.

Lake Assault Boats Available Through (GSA) Schedule

Lake Assault Boats, part of Fraser Shipyards and a leading manufacturer of purpose-built, mission-specific fire and rescue boats, announced that the company's boats are now listed on the U.S. government's General Services Administration (GSA) Schedule. Government agencies, including most municipal fire departments and law enforcement organizations can use GSA Schedule contracts – which contain pre-negotiated prices, delivery terms, warranties, and other terms and conditions – to streamline the process and leverage the buying power of the federal government. Lake Assault fire and patrol boats available on the GSA Schedule include 32 distinct configurations. They include a traditional V-hull or the company's signature landing craft style hull with a hydraulically-operated bow door and integrated ladder; full-width or walk-around pilot house; fire pump options; a wide range of electronics; scene and emergency lighting packages; and a choice of engine options from a variety of manufacturers.


Farley


LaGrange


Wiernicki


Campbell


McEvoy


Welch

AWO Elects Chairman

The American Waterways Operators elected a new slate of leaders during AWO's Spring Convention held in Washington, D.C. **James F. Farley**, Corporate Vice President – Industry Relations, Kirby Corporation, was elected Chairman. **Edward J. "Ted" Tregurtha**, President of Moran Towing Corporation, was elected Vice Chairman. Farley succeeds outgoing Chairman David G. Sehrt, SVP and Chief Engineering Officer of Ingram Barge Company.

New Orleans Port President LaGrange to Retire

The Board of Commissioners of the Port of New Orleans announced that President and CEO **Gary LaGrange** will retire at the end of his current contract in April, 2017. The Board is expected to name **Brandy Christian**, the Port's current Chief Operating Officer, to succeed LaGrange. LaGrange has served as President and CEO of the Port of New Orleans since 2001. During his tenure, the Port invested more than $500 million in infrastructure, opening state-of-the-art facilities including new container, intermodal, cruise and refrigerated terminals. Port revenues reached record heights for the fourth consecutive year in 2015, topped the half-million TEU mark for the first time and topped one million cruise passengers for the second consecutive year.

ABS Chairman Wiernicki Inducted to International Maritime Hall of Fame

Christopher Wiernicki, Chairman, President and CEO of ABS, was honored for his outstanding contributions to the maritime industry as he was inducted to the International Maritime Hall of Fame at the Maritime Association of the Port of New York and New Jersey's 23rd annual event. The International Hall of Fame recognizes maritime visionaries who best exemplify the qualities of futuristic thinking that will guide the maritime industry in the 21st Century. Accepting the award on behalf of ABS employees, Wiernicki said, "The people working in this industry and behind the scenes make it great by making a difference every day, and ABS employees have taught me over 20 years about what service and leadership in this industry really looks like."

AdvanTec Global Innovations Names Campbell VP

AdvanTec Global Innovations announced that **Matthew Campbell** has assumed the position of Vice President, Marketing & Product Management, with responsibility for marketing, and the development and growth of all brands within the marine products portfolio. He brings over 20 years of experience from a variety of high tech and manufacturing companies within the transportation sector including marine.

NOIA Elects McEvoy Chairman, Welch Vice Chairman

The National Ocean Industries Association (NOIA) has elected **Kevin McEvoy** as Chairman and **Dave Welch** as Vice Chairman for the upcoming 2016-2017 term. McEvoy and Welch assumed their positions at the NOIA Annual Meeting. Since 2011, McEvoy has served as CEO of Oceaneering International. He has undergraduate degrees from Brown University and an MBA from Texas A&M. He was the NOIA Vice Chairman for the 2015-2016 term. Welch becomes the first producer to serve as Vice Chairman in NOIA's history. Welch is the Chairman, President & CEO of Stone Energy. He also previously served on NOIA's board of directors. Welch studied petroleum engineering at LSU and Colorado School of Mines, economics and chemical engineering at Tulane, and business at Harvard.

WAGO Appoints Regional Sales Manager for Ontario

Marc Thibert has joined WAGO as Regional Sales Manager for Southwestern Ontario. Marc brings to the role several years of experience in the Automation sector in both sales and application support. Prior to joining WAGO, Marc was a District Application Specialist for Phoenix Contact for over seven years. He has also held positions in automation support and sales at Omron.

C & C Marine and Repair Names VP of Inland Sales

C&C Marine and Repair has hired **Dennis Brewster** as Vice President of Inland Sales. Dennis will be responsible for marketing C&C Marine's services for the new construction of


Thibert


Brewster


Skeeter


Bass


Stewart


Crenshaw

barges and vessels, as well as its barge and vessel repair capabilities. Brewster brings over forty years of experience in the marine construction industry, both in sales and in project management.

GLS Adds Skeeter to Management Team

The Great Lakes Towing Company has named **Nikita Skeeter**, a maritime professional with over 25 years of experience in shipbuilding and production management, as General Manager of Great Lakes Shipyard. Previously, Skeeter spent seven years working at shipyards in the Middle East and previously worked for Newport News Shipbuilding and NORSHIPCO. He holds a BS in Mechanical Engineering from Florida International University and a Master of Science in Electromechanical Engineering Technology from University of Miami.

Mercury Marine Taps Bass to Head EMEA Operations

Marty Bass has been appointed President - EMEA Mercury Marine. Bass, who previously was vice president of Mercury's product category management group based at Mercury headquarters in Fond du Lac, succeeds Mike Shedivy, who has lead EMEA – Mercury Marine since 2013. Bass holds a BS in electrical engineering from the University of Illinois; a master's degree in mechanical engineering from the U.S. Naval Academy's postgraduate school as well as an MBA from the Kellogg School of Management.


Jaenichen


Denny


SUNY Maritime


Greg Bombard


Franco

Seafarers' House Hires Development Director

Seafarers' House announced that **Jennifer Stewart**, CFRE, has been named development director. Jennifer comes to Seafarers' House from the Community Foundation of Broward, where she served as Chief Stewardship Officer. Jennifer is a graduate of Florida International University.

SCA Honors Crenshaw, MARAD's Jaenichen

U.S. Congressman **Ander Crenshaw** (R-FL) and MARAD Administrator **Chip Jaenichen** have received maritime leadership awards from the Shipbuilders Council of America (SCA). The awards recognize exemplary individuals who have demonstrated exceptional leadership, dedication and support to the shipbuilding and repair industry. According to SCA, Crenshaw, through his leadership on the House Defense Appropriations Subcommittee, has provided a critical voice on the importance of consistent funding for Navy shipbuilding. Jaenichen has consistently voiced his support of the U.S maritime industry and led his department in releasing the 2015 economic study that showed the U.S. shipbuilding and repair industry accounts for more than 400,000 jobs and contributes $38 billion in GDP to the economy.

Webasto Appoints New CEO

Webasto has named Mark Denny as President and CEO. With over 30 years of experience in the transportation industry, Denny most recently was president and CEO of Webasto-Edscha Cabrio USA, Webasto's convertible roof division. Webasto's products are used by industry's most respected boatbuilders and the firm an Innovation Award for its V50M chiller system in 2014.

24 Receive Naval Commissions at SUNY Maritime

In May, 24 midshipmen received commissions to become ensigns in the U.S. Navy at SUNY Maritime College. More than half of the students were selected for duty as strategic sealift officers, who provide logistical support in times of military deployment. Many will go on to work for Military Sealift Command; others were selected for surface warfare or submarines and one was selected to be a student naval aviator. The students received their new shoulder boards and covers, as well as their first salutes, many from members of their families. SUNY Maritime's spring commencement exercises were the next day. More than 220 students received their degrees.

Avalon Freight Services Debuts San Pedro-Avalon Shortsea Route

Avalon Freight Services, co-founded by Tim and **Greg Bombard** and **Harley Franco**, has begun year round freight service from Berth 95 in San Pedro and the Pebbly Beach freight facility in Avalon.

The new company will provide safe, fast, quiet, eco-friendly and state-of-the-art freight transportation to Catalina Island from the Mainland. All of AFS's Marine vessels significantly exceed all state and federal standards for air quality emissions and efficiencies.

Brickman Inducted into FCBFA Hall of Fame

Crowley's **Jay Brickman**, vice president of government and Cuba services, was honored last week with induction into the Hall of Fame of the Florida Customs Brokers & Forwarders Association (FCBFA), in recognition of his strong contributions to international trade, commerce and logistics. He is a recipient of the Thomas Crowley Award for Outstanding Achievement. Brickman received his bachelor's degree from the University of Florida and his master's degree from Johns Hopkins University.

Stromberg Named Executive Director for LU's Port Management Center

Lamar University has tapped **Erik Stromberg** as the inaugural executive director of the Center for Advances in Port Management. Stromberg previously served as CEO of the American Association of Port Authorities for nearly a decade and as head of the


Brickman


Stromberg

Ruud Haneveer and Jan van Hogerwou


Hudson

North Carolina State Ports Authority for 10 years. He holds a master's degree from the Institute for Marine Studies at the University of Washington.

Damen Opens U.S. Office

Damen Shipyards Group has announced the opening of a new branch office in Houston, Texas. This expansion, under the name of Damen North America, meets the increasing demand for Damen's unique shipbuilding concepts and repair and conversion services. "Establishing an office out of Houston demonstrates the power of the Damen global presence for mutually beneficial and cost effective solutions," said **Jan van Hogerwou**, Manager USA & Canada for New Buildings.

Hudson Awarded for Outstanding Service by CIP/OAS

HudsonAnalytix CEO **Cynthia Hudson** received the award as Outstanding Woman in the Port Protection and Security category of the 2016 Maritime Award of the Americas by the Inter-American Committee on Ports of the Organization of American States (OAS). Entries were received from all sub-regions of the Hemisphere from both public and private maritime sectors. Nominees were judged on their leadership and innovative contribution to the integral development of a competitive, safe, and sustainable port sector in the Americas.

PRODUCTS

Driveline's Propulsion Shafting Systems

Driveline Service of Portland, Inc. provides class certified propulsion shafting systems that meet or exceed the quality standards required for military and government marine applications, including Navy Combat, Patrol, and Special Operations Vessels. Solutions include lightweight composite tubing that reduces weight and eliminates support bearings as well as engineering and design assistance to naval architects, marine engineers, and boat builders.

www.driveline.com

Pdq's OneSource System

Pdq's OneSource System provides long range cell, wi-fi and high definition TV in one system for mobile users. PDQ Connect developed the OneSource system to provide cellular and wi-fi service, as well as HDTV using one antenna and one cable connection for all three services. The new system gives mobile users long range voice and data and cost free high definition TV.

www.pdqconnect.com

RSC Bio Solutions' Hydraulic Fluids Approved for MAN Applications

RSC Bio Solutions' EnviroLogic 3068 and 3100 high performance hydraulic fluids have been approved for use in MAN Diesel & Turbo systems. This allows RSC Bio Solutions to serve customers who have MAN stern tubes and propellers, primarily in marine transport, ferry and fishing industries. The EnviroLogic 3000 Series consists of biodegradable synthetic hydraulic fluids designed for extreme operating temperatures and pressures.

www.rscbio.com

Spectroline's Marine Leak Detection Kit

Left undetected, watercraft leaks can disrupt operation and cause equipment breakdown and environmental pollution. Spectroline's Marine Leak Detection Kit (OPK-400M) is designed to efficiently locate fuel, oil and hydraulic leaks in small marine craft. Packaged with two colored fluorescent dyes, it differentiates between multiple leaking fluid systems. Users can scan the system with a Spectroline flashlight to pinpoint even the most elusive leaks.

www.Spectroline.com

3Si debuts Constant Wear Lifejacket

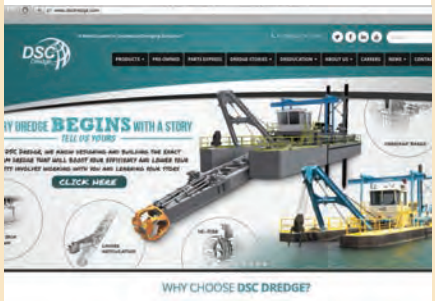
Safety and Survival Systems International's streamlined new lifejacket, the Ocean Safety Constant Wear, is designed for working seafarers. The unique shape of the Constant Wear is extremely comfortable and sculpted to fit the body for uninhibited upper body movement. It comes in three variations; wipe-clean, nylon and PVC. Its robust characteristics minimize wear and tear during demanding conditions met by offshore and windfarm personnel.

www.3Sisafety.com

DSC Dredge Launches New Website

DSC Dredge, LLC has a new website which is designed with a fresh new look, improved navigation and enhanced functionality. The new website is a reflection of DSC's commitment to furthering education and training about dredges and dredging – for dredge owners and their crews Customers are encouraged to visit and share dredging stories, which may be uploaded under the site's "Dredge Stories" page.

www.dscdredge.com



Receiver Extends WI-FI Range on the Water

Staying connected to the Internet is as important on a boat as it is at home or in the office. Shakespeare's new WebWhip is a fully integrated, long-range Wi-Fi receiver that increases coverage of accessible hotspots up to 7 miles. WebWhip creates a local hotspot on the boat for multiple users by connecting them to a standard Wi-Fi router and features a 100+ Mbps throughput.

www.shakespeare-ce.com/marine

Intertek Optimizes Potable Water Tank Inspections

Intertek's remotely operated vehicle (ROV) potable water tank inspection service allows the use of ROV's to inspect their large-capacity water tanks. Potable water tank inspection must be carried out periodically to mitigate health risks on marine vessels. Typically, potable water tanks are taken out of service to be emptied and inspected directly by personnel, a process which can be hazardous and time consuming.

www.intertek.com/ep

Lubriplate's Bio-Synxtreme HF Series Hydraulic Fluids

Lubriplate's Bio-Synxtreme HF Series Hydraulic Fluids meet U.S. EPA Vessel General Permit (VGP) Requirements and are based on advanced synthetic Polyalkylene Glycol (PAG)-based formulas. Providing long service life and operating reliability, lower maintenance costs, and reduced overall downtime, the fluids also provide excellent Anti-Wear Performance - Rated as anti-wear (AW) fluids according to ASTM D7043 testing and FZG testing.

www.lubriplate.com

IPA's Marine Fuel Tank Sweeper

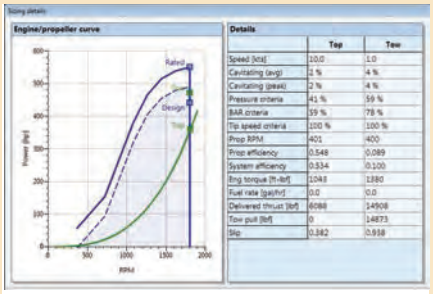
Innovative Products of America's #9040PN Marine Fuel Tank Sweeper removes water, impurities and sludge from fuel tanks and bilges. A durable, 25 GPM pneumatic-diaphragm pump, 30 micron particulate blocking and 10 micron water blocking filters with clear sight glass, quickly and efficiently remove contaminants, dirt, water, algae and sludge from marine fuel tanks. A 3-way ball valve allows bypass of bulk transfers.

www.ipatools.com

JonRie's Container Master Series of Winches

JonRie Marine Winches' new Container Master Series of Winches were designed with increased braking capability and rope capacity to deal with the 8000 TEU container ships calling on U.S. deep draft ports. The Container Master Series is a Heavy Duty design to deal with increased loading due to increased sail area of today's container ships.

www.marinewinch.com



HydroComp PropExpert 2016 Released

HydroComp PropExpert is the industry's most widely used propeller sizing tool for inboard-driven workboats and pleasure craft. It is used for application sizing and performance assessment by manufacturers and distributors of marine propellers, engines and transmissions. The 2016 release of PropExpert offers new propeller styles, an updated towing analysis, and improvements for fast high-pitch applications.

www.hydrocompinc.com

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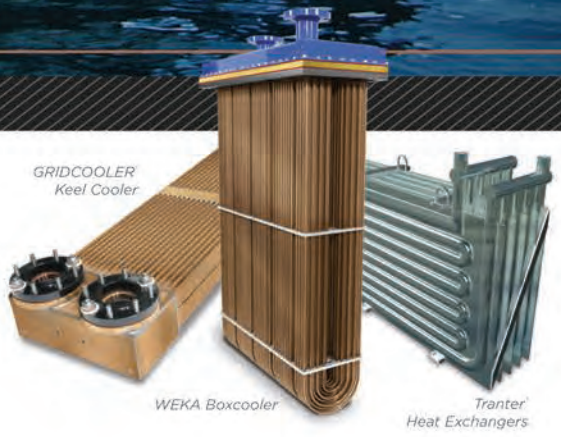

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