



GREEN MARINE / ALLIANCE VERTE

2009
NOVEMBER 30

GREENmarine magazine

GREEN MARINE SETS COURSE for ENVIRONMENTAL EXCELLENCE

Participants earn
SEAL OF APPROVAL

Auditing phase begins
early next year



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GREEN MARINE / ALLIANCE VERTE

Welcome to the inaugural issue of Green Marine Magazine. We hope you'll find this publication regarding the maritime industry's voluntary environmental program in the Great Lakes and St. Lawrence region both informative and useful.

Our goal is to explore key developments in greater depth. Among them is Green Marine's progress towards having all participants undergo an independent audit of their performance evaluations on a regular basis. The feedback provided by the participants in the pilot project done earlier this year should alleviate some concerns and generate additional ideas.

The magazine is also an opportunity to "hear" directly from participants, partners and supporters about what is working best for them and what they would still like to see added or changed as Green Marine pursues its mission of continual improvement. Membership and partnership feedback has already expanded the scope of our annual Green Tech conference so that it reflects the needs of our participants in addressing environmental concerns more effectively.

After all, it's the people within our industry or working in partnership with us who are making Green Marine a success. We hope you'll have a better appreciation for their efforts on the job and on their own time after reading this issue.



- Steve Fisher**
American Great Lakes Ports Association
- Gary LeRoux**
Association of Canadian Port Authorities
- Bruce Bowie**
Canadian Shipowners Association
- Ray Johnston**
Chamber of Marine Commerce
- Peter Landry**
Ontario Marine Transportation Forum
- Robert Masson**
St. Lawrence Economic Development Council
- Nicole Trépanier**
St. Lawrence Shipoperators
- Michael Broad**
Shipping Federation of Canada
- Stuart Theis**
United States Great Lakes Shipping Association

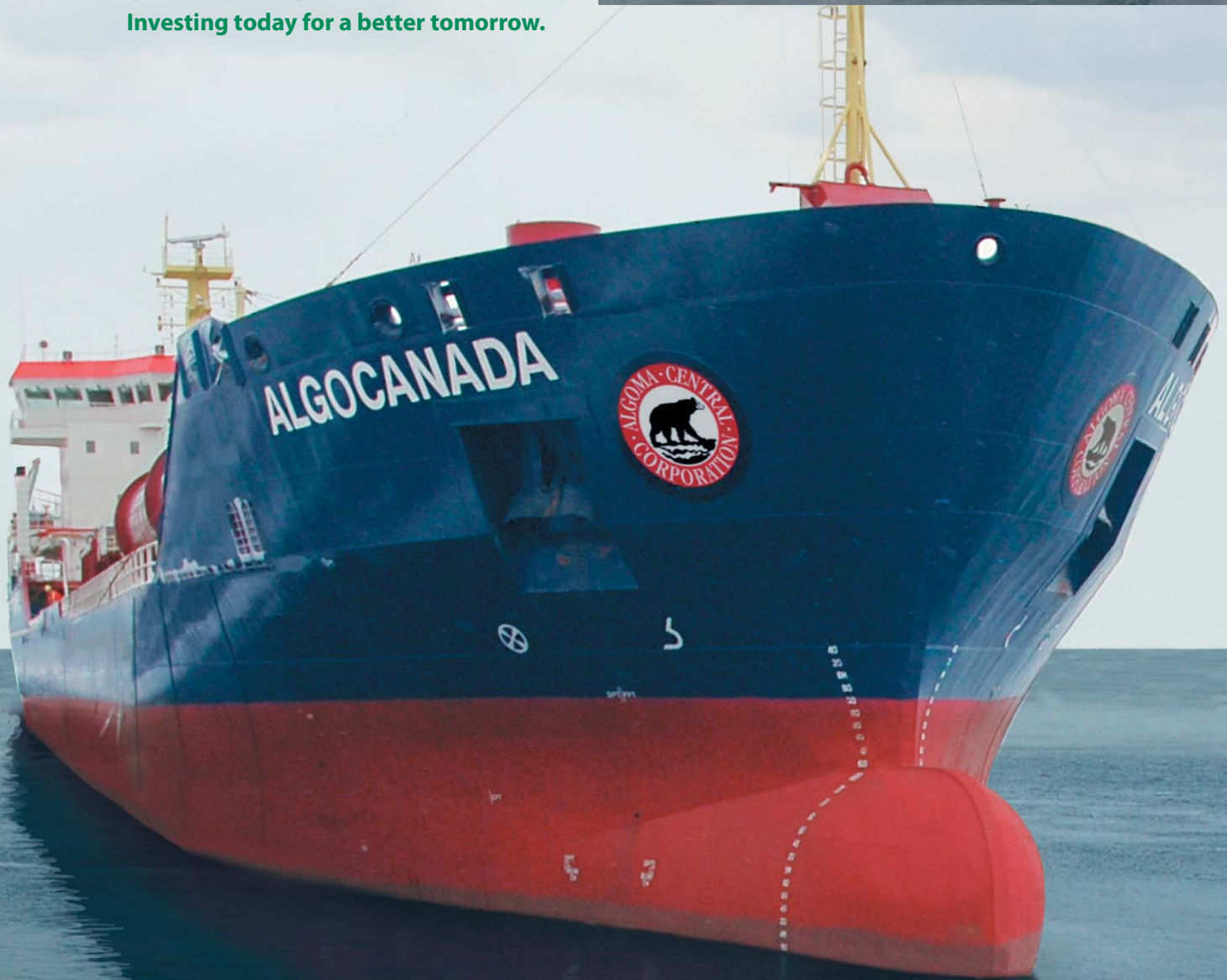


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GREENmarine magazine

PUBLISHER & EDITOR

Joyce Hammock

ASSOCIATE EDITOR

Brent Frederick

PRODUCTION MANAGER

Sonja Shestowsky

PRODUCTION TEAM

DESIGN AND LAYOUT: Ann Devoe

Maïa Godon

ADVERTISING

Coordinator

Wendy Hennick

Representative

Don Burns

CONTRIBUTING WRITER

Julie Gedeon

Cover photos: Tommy Schultz, SteF, Gino Santa Maria
Photo p.5: binax
Photos p.6-7: Orchidpoet, Foto Factory, Canfornav Inc.



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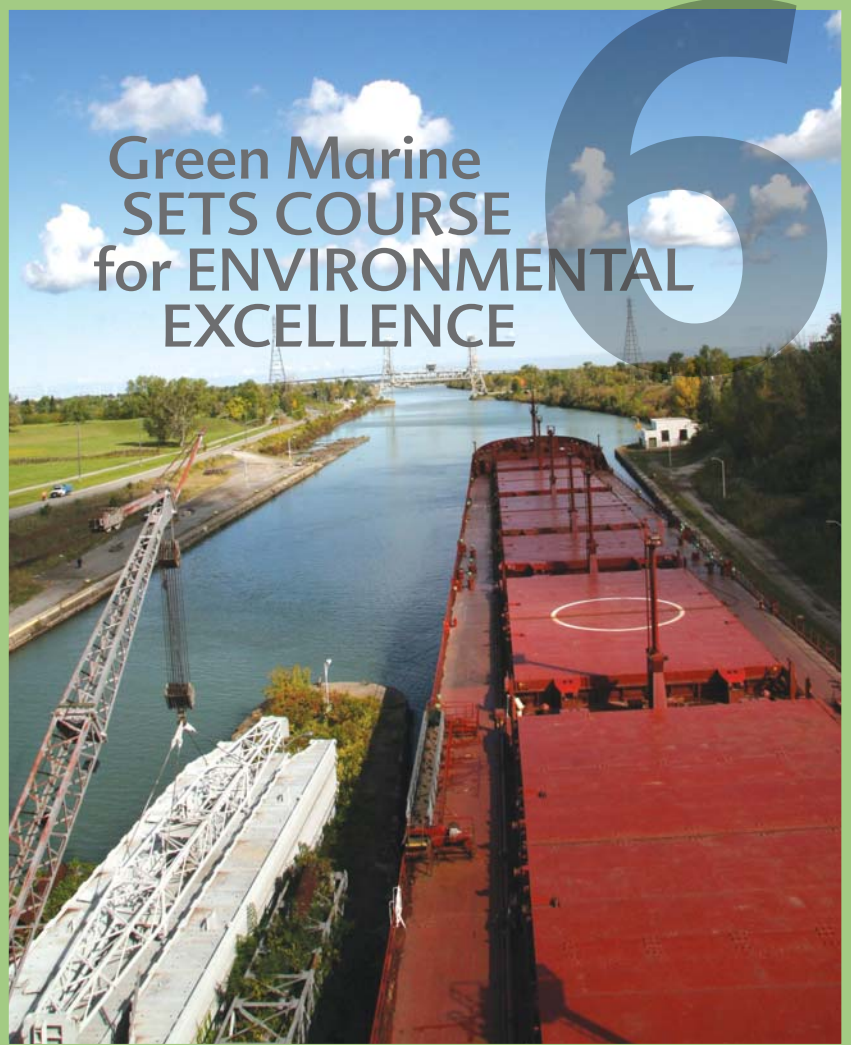


Photo: Ron Samson courtesy SLSMC

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GREEN MARINE





GREEN MARINE / ALLIANCE VERTE

SETS COURSE FOR ENVIRONMENTAL EXCELLENCE

New criteria finalized for ports

STORIES BY JULIE GEDEON

Within three short years (and many lengthy discussions), almost half of the marine transport industry operating in or along the St. Lawrence River and Great Lakes has become full-fledged participants in the Green Marine environmental program. ▶



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Photo: nicmac.ca

The 45 participants include ship owners and operators, ports, terminals, Seaway authorities, stevedores and other marine enterprises from both sides of the Canada-U.S. border. (See Page 25 for the full list.)



Every participant has obtained Green Marine's official certification for submitting a detailed self-evaluation of its 2008 operations. They each ranked their performance according to one of five ascending levels established for each of Green Marine's environmental priorities.

Committed to continual improvement, all of the participants have further agreed to each complete a self-evaluation yearly for publication, and to have their results independently verified on a regular basis.

GENUINE COMMITMENT

All this has occurred a lot faster than anticipated when the voluntary program was launched in 2007. "We had been cautioned by other industries with voluntary environmental programs that it could take five years or longer before we obtained this kind of buy-in," said Ray Johnston, the program's chair, and president of the Chamber of Marine Commerce. "It's primarily thanks to the strong leadership demonstrated by most of the large companies operating within the region that Green Marine has



Ray Johnston

Genuine commitment for achieving environmental sustainability





Photo: A. Delbalso, Wikipedia

evolved so quickly, and it speaks to the genuine commitment these companies have for achieving the environmental sustainability.”

David Bolduc, Green Marine’s co-ordinator, is equally pleased with the progress to date. “It’s amazing when you consider we have one and a half people on staff and it’s most definitely because of all the voluntary work that our participants are doing on various committees,” he said. “Now we’re hoping other marine companies will join so we can further build our credibility as an industry committed to sustainability.”

Green Marine is currently embarking on a recruitment campaign. “Our goal has always been to encompass the entire marine transportation industry within the Great Lakes and St. Lawrence region,” Mr. Johnston said. “So with the support of the Green Marine Management Corporation and our nine participating associations, we’re asking every CEO to identify other companies that should be a part of Green Marine and to speak with their counterparts about how those companies and the industry in general can benefit from their joining.”

POSITIVE IMAGE

What’s in it for participants? “We know Green Marine has very quickly established a very positive image by the number of supporters we’ve gained among government agencies and environmental groups,” Mr. Bolduc said. “We’re also seeing evidence, through joint pilot projects and other interesting proposals, that government agencies are viewing Green Marine as the go-to place or catalyst to discuss environmental matters with the industry.”

Steve Fisher, executive director of the American Great Lakes Ports Association, hopes the campaign will particularly boost U.S. membership. “I’m not sure why American companies have been slower to join, but I think more of them will do so once they realize how important this is from a public confidence standpoint,” he said. “Every industry now has an unofficial social contract with the public that obligates it to minimize its environmental footprint. And Green Marine is an effective way to demonstrate that our industry truly gets it in terms of our environmental responsibilities

and is moving in a structured and transparent manner towards improved environmental performance.”

Existing participants say the advantages of belonging to Green Marine are immediately evident. “We’re no longer reinventing the wheel in isolation,” said Pamela Davis, environmental and sustainability manager at the Cleveland-Cuyahoga County Port Authority. “Instead we’re streamlining things by working on volunteer committees to determine what the best existing environmental solutions are and then brainstorming about how we can borrow from those models to see if we can come up with one that’s even better.”

TECHNICAL EXPERTISE

As a member of the technical committee for the Great Lakes region, Ms. Davis regularly sees Green Marine in action. “There are some very technically sophisticated environmental managers volunteering their knowledge and experience to do a lot of the hard work on everyone’s behalf,” she said. “And it’s been great for me to know that I have those people as a sounding board now if I’m not sure how to deal with an environmental issue or want a second opinion.”

The amount of information being shared by Green Marine’s participants is unprecedented. “While this isn’t a stipulated requirement, it’s one of Green Marine’s big successes,” Mr. Johnston said.

Green its membership increases. A welcome is now being extended to companies involved in the container trade, as well as additional oil corporations. “These are global companies for the most part who have their own corporate environmental program or are participating in such programs in other geographic locations,” Mr. Johnston said. “Some of them are hesitant about having to do additional reporting for a new program.”

EQUIVALENCY CREDIT

The Shipping Federation of Canada is developing an equivalency chart for Green Marine so that such companies can easily see how their certified environmental management programs fit into Green Marine’s performance standards. “Without diluting Green Marine’s standards, we’re looking at how these compa-

Keep up with the latest developments in the Green Marine enviro





Photo: nicmac.ca



David Bolduc
Go-to place to discuss environmental matters



Steve Fisher
Moving in a structured, transparent manner



Pamela Davis
Environmental managers volunteering knowledge

nies can be integrated into the program and get credit for what they're doing through another program or their own corporate management systems," said Caroline Gravel, the Federation's director of environmental affairs.

SOLID PROGRAM

The Green Marine program itself is outlined to be as straightforward as possible. "The system is very

| Green Marine Environmental Performance Levels | |
|---|--|
| LEVEL | CRITERIA |
| 1 | Compliance with applicable regulations and adherence to Green Marine guiding principles |
| 2 | Systematic use of a specific number of best practices |
| 3 | Integration of best practices into an adopted management plan and specific understanding of the issue's impact |
| 4 | Introduction of new technologies |
| 5 | Excellence and leadership |

organized and it has been tested," Mr. Johnston emphasized. "It will always be open to improvement, but companies interested in joining will see that behind the Green Marine seal, there's a solid program with a defined process, as well as support, in place."

Each of Green Marine's six original priorities – aquatic invasive species, pollutant air emissions, greenhouse gases, cargo residues, oily water, and conflicts of use in ports and terminals – has clearly been stipulated along with the criteria necessary to attain one of the five environmental performance levels. As a minimum, Level 1 calls for regulatory compliance, while the highest Level 5 requires demonstrated leadership. (See chart at left.)

The participants averaged a Level 2 rating for their 2008 performance on all issues combined. "We had originally hoped everyone would attain a Level 3 within two years of the program's launch, but the fact that participants haven't done so indicates that we have set the bar very high," Mr. Johnston said.

STRIVING HIGHER

And that bar is likely to go higher. "We have to reassess our performance indicators annually so that





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GROUPE DESGAGNÉS'S INVOLVEMENT IN ENVIRONMENTAL INITIATIVES

COMPANY PROFILE

Desgagnés has a long history in marine carriage of general cargo, dry and liquid bulk, and passengers. With gross receipts of over \$200 million and more than 875 employees in peak season, its activities also extend to marine vessel repairs and maintenance, as well as to rental and operation of cranes and heavy machinery.

Company activities cover the St. Lawrence River network & the Great Lakes, the Canadian Eastern Arctic, the East coasts of Canada and the United States, as well as the seas worldwide.

In addition to having one ship under construction, the company owns and operates a fleet of 17 vessels, with an overall deadweight of 190,000 mt. All vessels fly the Canadian flag and are operated by Canadian crews, with the exception of a few vessels when used for international trade.

Also, in recent years, despite the financial crisis, the company has realised a \$300 million investment plan to renew and expand its fleet in order to improve sealift services to the Northern Communities, on the Middle and Lower North Shore as well as for its tanker division, maintain its leadership in these difficult and challenging routes and increase its worldwide participation.

GREEN MARINE INVOLVEMENT

Groupe Desgagnés has committed itself to the Green Marine initiative because it meets exactly the vision of continuous improvement through best environmental practices and use of new technology, an approach highly valued by the company.

The Green Marine environmental policy is a practical initiative focusing on the six main industry environmental issues with five levels of certification. All members' actions aim to exceed legal requirements and to continuously improve the industry's progress in a manner affordable and adapted to each member. This is the reason why this year, Groupe Desgagnés has allowed researchers access to its vessels in order to help implement the development of innovative solutions, such as for ballast water treatment.

This voluntary approach has evolved in a collaborative manner with governments and citizen groups in order to stay connected with the real needs and concerns of today's society.

Such collective efforts ensure that the environmental actions of individual corporations are focused on real environmental concerns, and together, they can make a difference for overall environmental improvement.

A sustainable development approach and voluntary initiatives from the key players in the industry are the building blocks for a better environment and the viability of our fleets, but society as a whole needs to work towards a goal of maintaining maritime services and avoiding a shift to less environmentally efficient transportation modes.

Desgagnés wants to be part of the solution and it is through the Green Marine initiative that we choose to focus our best efforts in order to improve our environmental actions.

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Photo: Fednav

any changes in government regulations are included in the criteria for Level 1 and so new technological solutions become incorporated into the higher performance levels,” Mr. Bolduc explained. “So this will be a constant work-in-progress and it’s thanks to the volunteer efforts of the members on our committees that we’ll be able to keep all of this up to date.”

The entire Green Marine program is regarded as an ongoing work-in-progress that aims for continual environmental improvement. In keeping with this goal, Green Marine is adding new environmental issues. “We recognized after the first year of evaluation that the program was more geared to ship owners and operators,” Mr. Bolduc said. “So we’ve worked a lot over the past few months to develop additional criteria for ports and terminals.”

PORT LEADERSHIP

Starting with their 2009 operations, ports and terminals will assess their environmental performance when it comes to three aspects of *Water and Land Pollution Prevention*, namely: water runoff, spill prevention and cargo residues.

Another category labelled *Environmental Leader-*

ship will apply to port authorities only. “We realized the original version of Green Marine wasn’t very well adapted to the operation of port authorities, because they’re basically landlords for tenants whose terminal operations are more likely have a direct environmental impact,” Mr. Bolduc said. “So we thought about how to recognize and promote the important role that port authorities can play in engaging their tenants in new environmental processes.”

While the exact criteria will be available soon, any projects that demonstrate a port’s environmental leadership, such as the installation of cold-ironing facilities or a pilot project that makes ships or terminal operations at the port more sustainable, will likely be recognized. “It could also include a port authority publicizing its sustainable development policy on its website or financing an environmental cause,” Mr. Bolduc added. “And, of course, persuading tenants to become Green Marine participants would be an important element.”

AUDITING PHASE

Final touches are also being put on the process to have the performance results of Green Marine’s participants independently audited on a regular basis.





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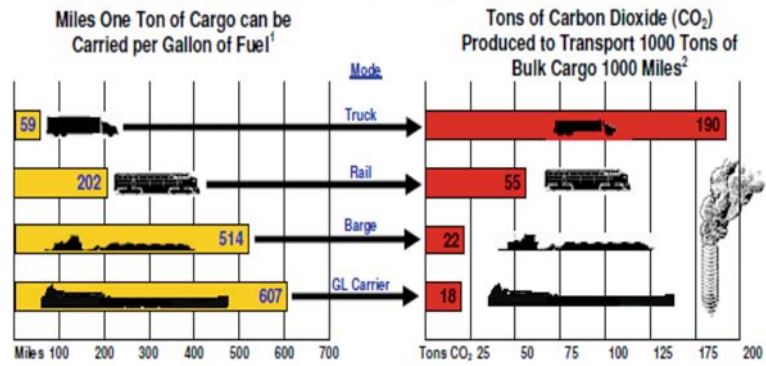


To facilitate continued large capital expenditures of this

nature, the industry requires a stable predictable regulatory environment. A regulatory regime that focuses on desired outcomes rather than prescriptive standards will provide an investment climate that allows for continued investment in new fuel-efficient, emissions



Fuel Efficiency and Environmental Impact Great Lakes Navigation



1. Source: USDOT Maritime Administration and Minnesota Department of Transportation
2. Assumes US DOE Fuel and Energy Emission Coefficient of 22.38 lbs of CO₂ per gallon (No. 1, 2, 4 Fuel Oils and Diesel)

compliant engines and other technological improvements. By continuing to foster innovation and technological advances in emerging technologies, industry will benefit through a return on investment via efficiency gains as well as direct benefits to the environment.

The Lower Lakes Group of companies specializes in short sea shipping, moving on a combined basis approximately **18 million tons of cargo annually** on the Great Lakes / St. Lawrence Seaway.

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“We’ve decided the auditing process will take place every two years, which is consistent or more frequent than such voluntary programs in other industries,” Mr. Bolduc said. “Ship owners and operators will be the first to undergo audits because ports and terminals are more recent additions and we want to give them a bit more time – as we did for ship owners and operators – to familiarize themselves with the self-evaluation criteria and reporting process.”

Green Marine is recommending Lloyd’s Register Quality Assurance, Inc. for the audits but if a company prefers to use another firm, Green Marine will arrange to brief those auditors so they can perform the audit to the program’s satisfaction.

A pilot project conducted earlier this year bodes well for Green Marine’s independent assessment phase

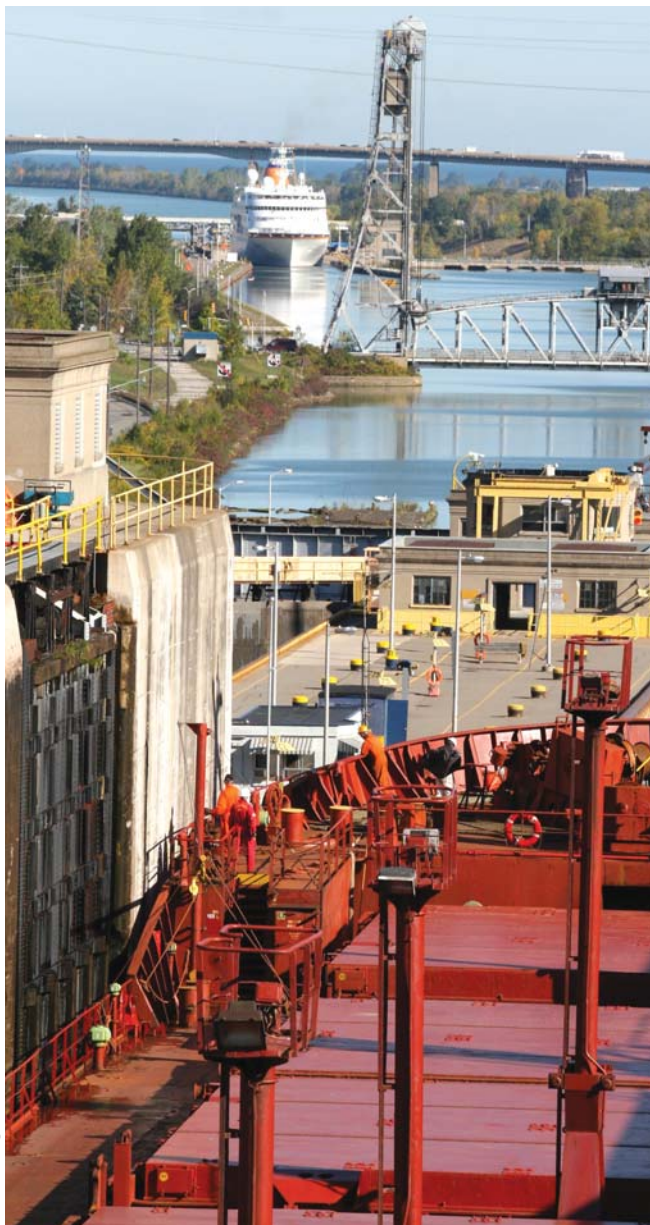


Photo: Ron Samson

to proceed well once it begins with 2009 performance results early next year. (Find out more about how the test-run audits went and the approach being taken on Page 29).

THINKING BIG

Green Marine’s founders remain keen to expand the program to encompass other geographical regions in Canada and the United States. The idea is to use the same five levels of performance indicators but add issues of specific concern to other areas.

“We’re certainly making Transport Canada and Environment Canada aware of what Green Marine is doing, and discussing ways in which they might assist us,” Mr. Johnston said.

That outreach is likewise extended to the U.S. “We would really like the Environmental Protection Agency and other American government agencies to become more involved,” Mr. Bolduc said. “I’m hopeful this will happen as Green Marine continues to prove itself, and its successes are discussed by its participants and the nine associations that now actively support the program.” (See Page 21 for the full list of associations.)

PARTNERS AND SUPPORTERS

Green Marine is also welcoming more partners. These include corporate entities that don’t operate ships, ports, terminals or shipyards, but run a business linked to the marine transport industry as marine agents, shippers, suppliers or in some other capacity. Or they are non-profit organizations connected with the marine sector, including marine associations, research and development centres, and training facilities.



Photo: Jim McRae





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In addition, the technology forum will provide the promoters of new technologies with an avenue for further developing their products.

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Registration forms for anyone interested in being an exhibitor at Green Tech 2010 are now available on our website. Space is limited, so please be sure to complete the registration form as soon as possible.

To see the preliminary program or to register, please visit our Web site at www.green-marine.org/green-tech-seminar.

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Shipping Federation of Canada
shipfed.ca

United States Great Lakes Shipping Association
usglsa.org

Rightship Americas (ship vetting specialists) and Commonwealth Oil Corporation (manufacturers of high-performance metalworking and specialty fluids) are the latest to join Green Marine, bringing the number of partners to 25.

“Our partners serve an important role in providing the environmental excellence that our industry is demanding in terms of knowledge, products and services,” Mr. Johnston said. “By participating in Green Marine, they become keenly aware of our very specific objectives for continuously improving our environmental performance and can work more effectively and efficiently with us in achieving the higher environmental performance standards outlined in our program.”

Green Marine’s organizers are equally pleased with the number of supporters already on board. These include municipalities, government agencies, and community and environmental groups that support Green Marine’s program either symbolically or through the provision of services. “It’s encouraging for us to get this kind of support because it indicates that we’re creating greater awareness about the marine industry’s environmental efforts and involving other stakeholders who are genuinely interested in giving us constructive feedback,” Mr. Johnston said. ■



Photo: Oneworld-Images



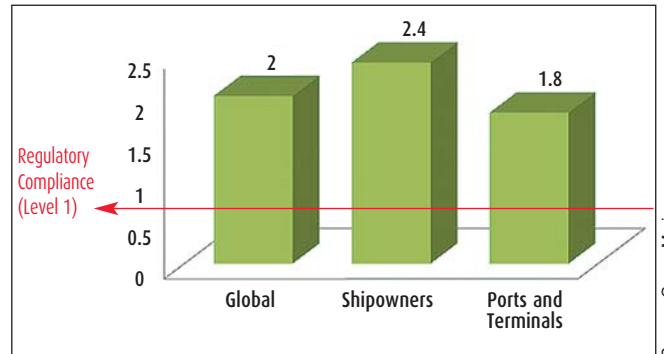


ENVIRONMENTAL

Each of Green Marine’s six original priorities – aquatic invasive species, pollutant air emissions (sulphur oxide and nitrogen oxide), greenhouse gases, cargo residues, oily water, and conflicts of use in ports and terminals – has clearly been stipulated along with the criteria necessary to attain environmental performance levels. As a minimum, Level 1 calls for regulatory compliance, while the highest Level 5 (not shown) would require demonstrated leadership.

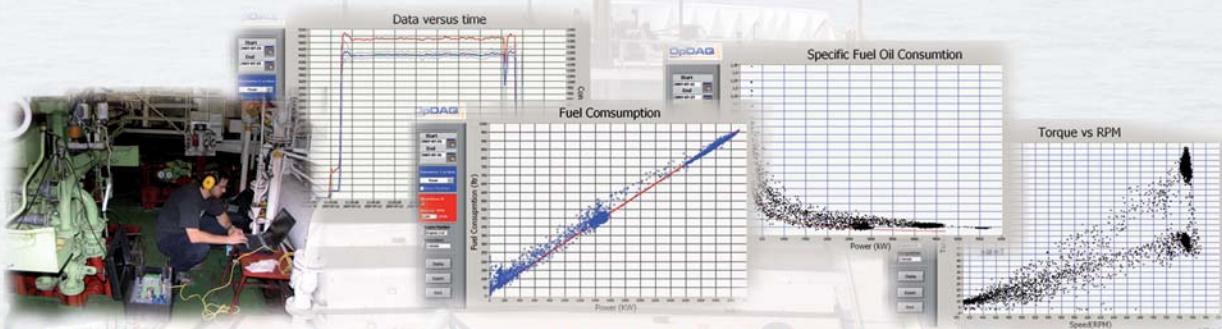
The two diagrams on the facing page show the average levels attained by shipowners and by ports and terminals for the specific environmental issues targeted by the Green Marine environmental program.

AVERAGE LEVELS ATTAINED BY ALL GREEN MARINE PARTICIPANTS FOR 2008



Source: Green Marine

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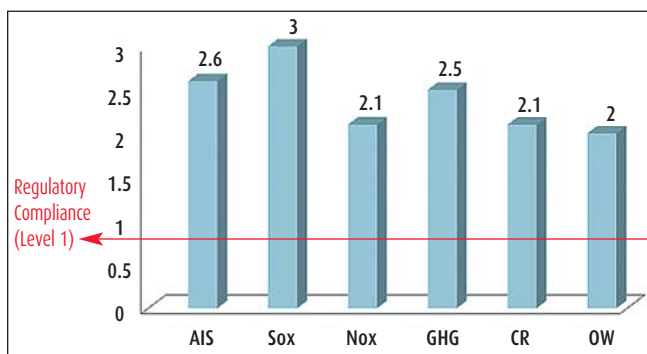
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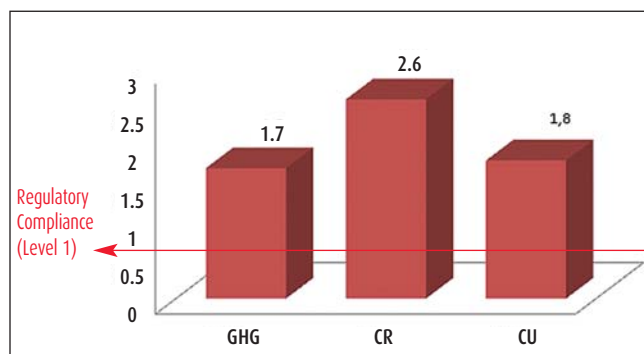


PERFORMANCE

AVERAGE LEVELS ATTAINED BY SHIPOWNERS PARTICIPATING IN THE GREEN MARINE ENVIRONMENTAL PROGRAM FOR 2008



AVERAGE LEVELS ATTAINED BY PORTS AND TERMINALS PARTICIPATING IN THE GREEN MARINE ENVIRONMENTAL PROGRAM FOR 2008



Legend:

AIS: Aquatic invasive species

SOx: Pollutant air emissions: sulphur oxide

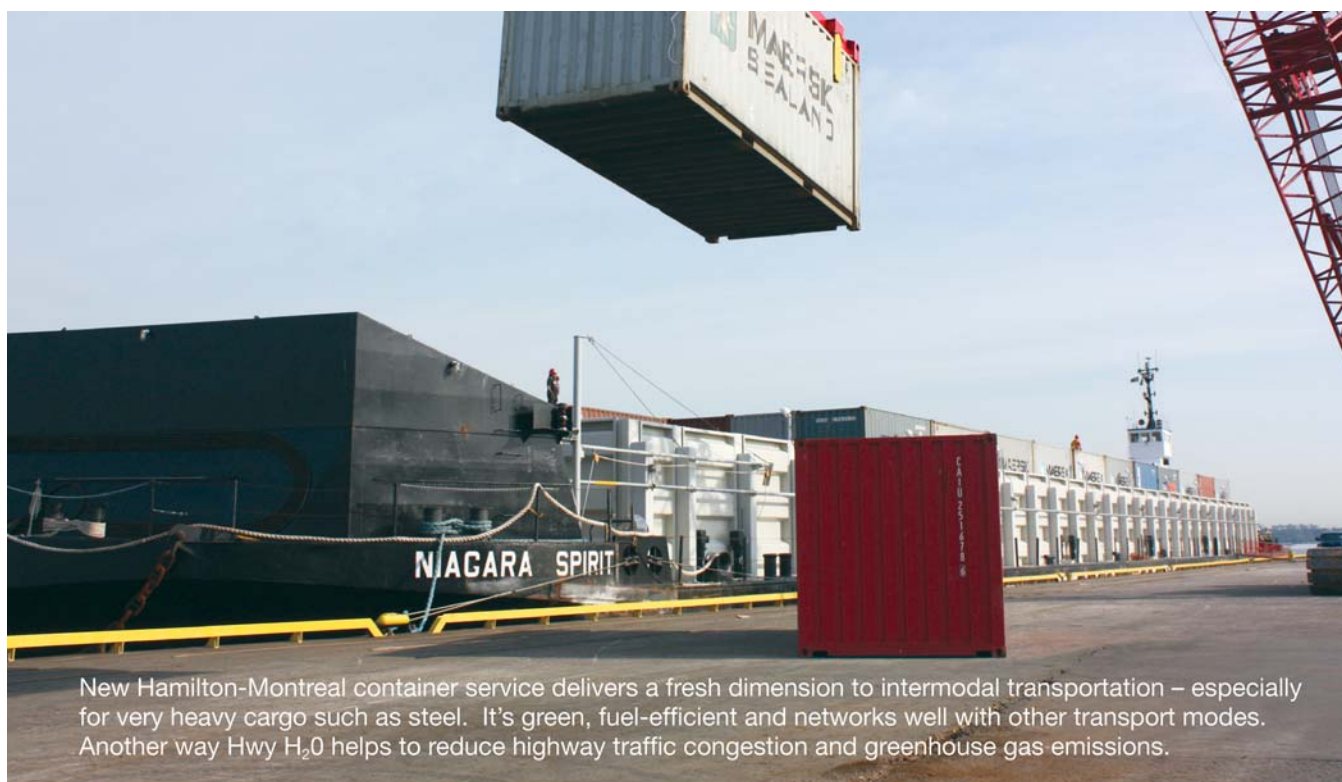
NOx: Pollutant air emissions: nitrogen oxide

GHG: Greenhouse gases

CR: Cargo residues

OW: Oily water

CU: Conflicts of use in ports and terminals



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Green Marine certification ceremony held in Toronto in May.

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PARTICIPANTS earn their SEAL OF APPROVAL



All of Green Marine's participants use a self-evaluation guide to assess their performance on a yearly basis in terms of the program's environmental priorities. The participants give a summary of their results to Green Marine's co-ordinator by a specified deadline.

Every two years, they must have their evaluations audited by an independent third party. As part of its commitment to full transparency, Green Marine plans to have every participant's results published.

During their first year of membership, participants receive a logo indicating their certification is "pending." This is replaced with a "certified" logo during their second year after they have submitted their self-evaluation.

Green Marine's logos enable the participants to publicize their involvement in the industry's environmental initiative. They also receive a yearly certificate attesting to their ongoing participation in the program.

The certificates are presented during the annual Green Tech conference held each spring to help participants become aware of new and developing technologies in the maritime industry.

Green Marine's participants include domestic and international ship owners and operators, ports, terminals, stevedoring companies, and the Seaway corporations. ■



Photo: Canformav Inc.





THE CURRENT PARTICIPANTS ARE:

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 Bunge Canada
 Canfornav
 Cleveland-Cuyahoga County Port Authority
 Cogema
 CSL Group
 CTMA Group
 Duluth Seaway Port Authority
 Empire Stevedoring Company Limited
 Federal Marine Terminals
 Fednav Limited
 Groupe Desgagnés
 Hamilton Port Authority
 Illinois International Port District
 IMTT-Québec
 Les Élévateurs de Trois-Rivières
 Logistec Corporation
 Lower Lakes Towing Limited
 McKeil Marine
 Montreal Gateway Terminals Partnership
 Montreal Port Authority
 Ocean Group
 Oceanex
 Oshawa Harbour Commission
 Porlier Express
 Port of Milwaukee
 Port of Valleyfield
 Quebec Port Authority
 Reformar
 Rigel Shipping Canada
 Rio Tinto Alcan

Saguenay Port Authority
 Saint Lawrence Seaway Development Corporation
 St. Lawrence Seaway Management Corporation
 Seaway Marine Transport
 Sept-Îles Port Authority
 Société des traversiers du Québec
 Thunder Bay Port Authority
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Photo: Groupe Desgagnés



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CEOs take the helm **BENEFITS EXTEND BEYOND THE ENVIRONMENT**

Green Marine has been propelled from the outset by the CEOs of the participating companies. Having the top people involved directly has firmly anchored each participant's commitment to the environmental program.

"It definitely helps to ensure that the message about that pledge to improve environmental performance floats down through the rest of the company, and that certain resources will be made available," said Ray Johnston, Green Marine's chair.

BOARD DIALOGUE

Allister Paterson, president and CEO of Seaway Marine Transport, has found that participating in Green Marine has made it easier to discuss environmental improvements with his company's board of directors.

"It's sometimes a lonely battle to try to improve things, but when you sit down with other well-inten-

tioned people in your industry and say together we need to do this, it provides the validation and momentum for what I want to do at my company," he said.

"I now give our board detailed briefings of our performance against the program's standards, as well as where I think we can improve, and what we need to achieve that improvement. It would have been more difficult for me to have these discussions on a regular basis without the Green Marine program."

Green Marine has created a peer pressure that's motivating companies to "lift their game," he added. "It's almost a competitive issue now and companies that don't try to improve performance might be visible by their absence, which I think is good."

CORPORATE BRAND

The whole internal psyche at Seaway Marine Transport has changed as a result. "Our company always took its environmental responsibilities serious-



Allister Paterson
Raised level of environmental analytics



Pierre Gagnon
Giving customers a sustainable route



Eric Reinelt
Network of colleagues to share ideas





ly, but it wasn't a leader in this regard," Mr. Paterson admitted. "Now that we're heading towards an external audit of our performance results on some very basic environmental metrics that will be visible to anybody who wants to see them, this has become a serious corporate brand issue that raises the level of internal discussion and efforts."

Seaway Marine Transport's participation in Green Marine prompted the company to hire an environmental director, Mira Hube, and give her the additional resources to determine the company's environmental footprint in detail.

"You need to start with a detailed understanding of where you are and what's possible," Mr. Paterson said. "So our first major achievement is that we've really raised our level of environmental analytics as a company."

PRECISE MAP

The second big step has been to identify with the help of Green Marine's framework what the company has to do to improve its environmental performance. "We have a map now that clearly outlines what we're going to do in terms of procedural changes, capital spending, equipment testing and possibly trialing of new technologies to improve our environmental positioning this year and next," Mr. Paterson said.

"We have identified a few shortcomings and we're spending capital on some technological solutions this winter, something we have moved forward because when you get into the analytics, you realize where you're not performing as well as you thought or want in some areas and clear where you need to make further investments."

Mr. Paterson applauded Green Marine for having galvanized the industry towards "doing what's right" for the environment. "Most of the people within our business are well-intentioned, but this gives us a structure to work in an orchestrated manner," he said. "And I would suggest it's important for all of us to take part because there's always more political capital with government and stakeholders when an entire industry does something."

Gaining public confidence will be one of Green Marine's biggest successes, according to Pierre Gagnon, president and CEO of the Sept-Îles Port Authority. "Our industry has always been the most ecologically sound when it comes to transportation modes, but we haven't been very successful in the past in communicating our sustainability," he said. "Green Marine gives us a clear framework in which to demonstrate that our efforts go beyond legal requirements



Photo: Sept-Îles Port Authority

towards an environmental leadership that involves continually improving our performance in ways that can be measured annually."

COMPETITIVE EDGE

These documented efforts will give the St. Lawrence and Great Lakes corridor a competitive edge, he added confidently. "By assuming a leadership role through Green Marine, we're giving our customers a sustainable route that I believe will definitely favour commerce through this continentally strategic corridor," he said. "Green Marine is the ticket for manufacturers, distributors and shippers that want to further green their supply chain, and everyone these days is feeling the pressure to do business in increasingly sustainable ways."

Mr. Gagnon proudly noted that several of Green Marine's partners are regular business associates of the Port of Sept-Îles. "Green Marine has been an important source of mobilization in our community, and is resulting in these companies working more closely with the port on environmental matters," he said. "And the same thing is happening on a larger scale with Green Marine effectively mobilizing our industry to become environmental leaders and having a trustworthy way to show this progress so that it can give us a real competitive advantage."





TRUSTWORTHY MESSAGE

Eric Reinelt, director of the Port of Milwaukee, is also delighted that Green Marine has prompted the industry to document its environmental efforts. “Sometimes it’s hard to get across through the media the good things we’re doing,” he said. “Green Marine gives our industry a way to prove that we want to be a part of the solution when it comes to environmental concerns and to show our step-by-step progression.”

Regular auditing of each participant’s self-evaluations will give the program its trustworthiness, he added. “It also shows that we’re really serious.”

Mr. Reinelt said it would have been much harder for smaller ports and marine companies to achieve this on their own. “Of course, we had already been complying with various regulations, but Green Marine has given us a template to go beyond what we might have done alone, and a network of colleagues to share ideas and learn from each other’s experi-

ences,” he said. “And the overall impact of our combined efforts is much greater than anything we could have accomplished individually.”

The credibility that Green Marine is establishing is the largest benefit in Mr. Reinelt’s opinion. “I’ve been able to talk to my board, the mayor and other members of my community about what our port is doing as part of Green Marine and they’re impressed and pleased that we’re taking such initiative and moving forward with it,” he said. “I’ve even been able to get the local press to listen.” ■



Photo: Seaway Marine Transport

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AUDITING PHASE begins EARLY NEXT YEAR

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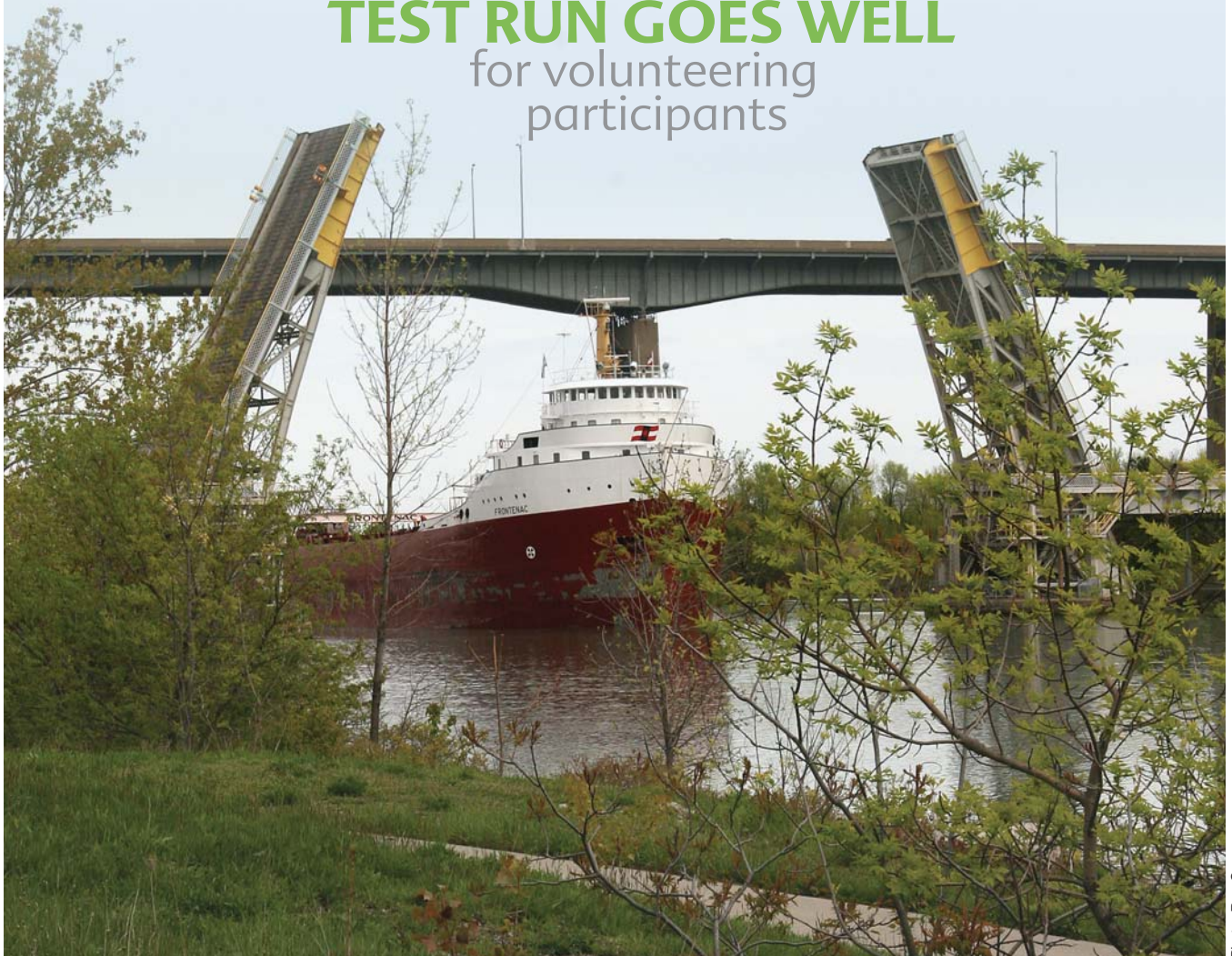


Photo: Ron Samson

Green Marine launches the auditing phase of its environmental program early next year with a verification of 2009 performance results.

“We’re on the auditing fast track, partly because we’ve benefited from the experience of other industries, but mostly because our CEOs made it clear from the start that external verification was crucial for the program’s credibility and should be implemented as soon as possible,” said David Bolduc, Green Marine’s co-ordinator.

All participants have agreed to have their self-eval-

uations verified on a regular basis by an independent auditing firm approved by Green Marine.

TWO-YEAR TIMEFRAME

“Companies will be audited every two years, which is in keeping with what we’ve seen in other programs,” said Green Marine’s chair, Ray Johnston. “In fact, it’s every three to five years in many cases, so every two years will provide the necessary vigilance without the process being onerous.”

Shipping companies will be audited first, with





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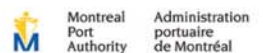


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Marine transportation is the most cost-effective, efficient and safe method of bulk shipment for the approximately

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As the largest private shipper in the Great Lakes, we have a vested interest in promoting a sustainable seaway system, and look forward to working with all interested stakeholders to improve efficiencies, and ensure that marine transportation remains a cost-effective mode of transportation.

Great Lakes shippers, Seaway management, customers, and government policy-makers, all have an important role to play in ensuring the sustainability of Canada's marine transportation network as a cost-effective, sustainable method for goods movement.

ArcelorMittal shares this commitment and is working with government and environmental stakeholders on both sides of the border to improve the health of the Great Lakes through a unique bi-national, public-private partnership. The "Sustain Our Great Lakes" program works to restore, protect and preserve the fragile habitats and ecosystems that form the world's largest freshwater system.



Juergen G. Schachler
President and Chief Executive Officer
ArcelorMittal Dofasco

A stylized, handwritten signature in black ink, appearing to read 'J. Schachler'.

ArcelorMittal and ArcelorMittal Dofasco recognize the advantage of a well-managed Great Lakes and Seaway system, not only for our business, but for the enjoyment of our employees and the communities in which we operate.



Hugh Hutton
Participants prepared for audit



Marc Gagnon
Criteria are very specific



Caroline Denis
Greater collaboration, information sharing

ports, terminals and possibly other participants following a year later (with their 2010 performance results). “It made sense for the shipping companies to be first, since they’ve been under public scrutiny the longest on environmental matters,” Mr. Bolduc said.

Green Marine arranged for a test run of the auditing process last spring. Two shipping companies (Fednav and Canada Steamship Lines), two ports (Montreal and Hamilton) and one port terminal operator (Federal Marine Terminals) volunteered to make the pilot project reflective of the membership.

EXTENSIVE EXPERIENCE

Lloyd’s Register Quality Assurance, Inc. (LRQA), which specializes in independent third-party certification of all types of organizational management systems, was selected from among several auditing firms that submitted proposals.

Hugh Hutton, senior lead assessor and North American business manager for security management systems, was assigned the job. His 49 years of marine industry experience includes 15 years with the British Merchant Navy, mainly as a chief engineer. He’s also held senior executive positions with Arctic Transportation Ltd., Misener Shipping and Great Lakes Bulk Carriers. Mr. Hutton has done extensive auditing for ISO certification, but also for other international, national and local regulations and standards.

“I find assessing the environmental management process to be personally most satisfying because I’m working with a company to help it achieve continual improvement as it works to mitigate its environmental

impacts,” he said. “And when I return and see improvements, I’m proud of the contributions that I was able to make as the company’s assessor.”

Green Marine’s detailed self-evaluation guide (one for shipping companies; another for ports and terminals) specifies the criteria. “Each company had to show the documented proof to support its answers to the guide’s questions,” Mr. Hutton said. “There’s a certain level of performance – from 1 up to 5 – that each participant self-declares for each of Green Marine’s priorities, and it’s my job to verify whether that grade is supported by objective evidence.”

CLEAR CRITERIA

Marc Gagnon, Fednav’s director of government affairs and regulatory compliance, was pleased with how smoothly and quickly the audit proceeded, with Mr. Hutton spending a day at Fednav’s head office and a half-day at the Federal Marine Terminals division. “Whenever you’re doing something new, you’re never certain what’ll happen, but Green Marine’s criteria are very specific, which makes it clear what the auditor has to verify,” he said.

It also helped to have all the staff responsible for various aspects of the Green Marine program’s implementation present to answer questions, he added.

The process did provide some insight into how to do a few things better. “For instance, it was clear to the auditor from our discussions with him that we had fulfilled the Green Marine Level 1 requirement of really understanding all governmental regulations, but he suggested we relate this understanding in more detail





in future so it's immediately apparent to another auditor from the report we send to Green Marine," Mr. Gagnon said.

WORTHWHILE WORK

When Mr. Hutton visited CSL's offices in late March, the environmental co-ordinator had a full binder of documents waiting for him. "I and a colleague at V-Ships Group, which manages our ships and crews, put together all the documentation so that we could easily prove that we had done what we said we had done," Caroline Denis recalled. The process also involved meeting with people from other departments every so often to verify or supplement information, as well as going on board vessels to do spot checks and to talk with the captain and crew who also sent requested photographs.

"I'm not going to lie: it's a lot of work, but definitely worthwhile," Ms. Denis said. "Now we know exactly what the environmental impact of our activities is and we've already taken some actions to go beyond the Level 1 to 3 ratings that we achieved with our 2008 results."

All that work is also paying off in terms of customer and public recognition. "The ins and outs of the marine industry aren't that well known, so Green Marine helps us to convey what exactly it is that we're doing to become more sustainable," Ms. Denis said. "We've just started to inform our clients about these efforts, but we're already receiving some acknowledgment from them and the government that we have done a lot of work."

Ms. Denis is confident the process will be somewhat easier for CSL for the 2009 results. "It initially takes time to ensure you understand all the criteria and don't overlook anything," she said. "Now we know exactly what's required but, of course, we still have to pay attention to any changes Green Marine makes."

SHARED KNOWLEDGE

Longstanding experience with various audits had the Port of Montreal ready for Mr. Hutton's visit. "We always keep detailed records of everything we do, and this made the auditing process go quickly and smoothly," confirmed Lyne Martin, the Montreal Port Authority's director for environment. "With an environmental department staffed by three people, we've also been at the forefront of formulating the models for accurately calculating air emissions and invasive species."

She noted that all the companies taking part in the test run were quite large with dedicated environmental departments. "We still have to determine how well the

auditing process will go with smaller companies with fewer employees and resources," she said. "I think the key will be for them to document everything as they go along."

The models being devised by the Port of Montreal and other leading marine enterprises will help. "One of the best things about Green Marine is the willingness of our industry leaders to share key environmental tools so that the overall environmental performance of the marine sector continuously improves," Mr. Bolduc said.

Ms. Denis wholeheartedly agreed: "This mobilization of our industry through Green Marine is leading to much greater information sharing and collaboration on environmental matters."

BY THE NUMBERS

Having some big players take part in the test run of the auditing process was part of this philosophy, and will make the process clearer for all participants by



Photo: Montreal Port Authority





ironing out the few initial kinks. For instance, in one case it wasn't clear from Green Marine's criteria what kind of proof had to be supplied to establish that a certain performance level had been obtained. In another case, different coefficients for calculating emissions were being used.

"The pilot phase gave us an excellent opportunity to clarify documentation, emission calculations and other requirements to help ensure consistency," Mr. Hutton said.

Mr. Hutton commended the participants for being thoroughly prepared for the audit. "It was evident that a lot of work had gone into collecting the data, and this helped streamline the auditing process," he said. "Less auditing time was required when each criterion and its corresponding evidence were numbered, and as part of my feedback to the program, I've suggested that all the criteria in the self-evaluation guides be numbered in the future."

The use of a binder with tags also facilitated the rapid location of information.

As Mr. Hutton checks various logs, reports and other documentation to substantiate a level claimed by a participant, he also verifies whether there's a process



Photo: Fednav

in places to ensure that all legal and certification requirements are kept up to date.

LRQA assessors value industry best practices. "We never go into a company and insist on one way of keeping records, but we might have suggestions that help clients streamline their paperwork," Mr. Hutton said.

AUDITOR APPROVAL

Green Marine has selected LRQA as its primary auditor, but participants are free to choose different auditors provided they're certified as having completed Green Marine's briefing and training sessions. "We

want to ensure there's consistency if a participant decides to use another firm," Mr. Johnston said. "So we're now working out the details to have the proper documentation and familiarization session."

A list of Green Marine accredited auditors will be made available on Green Marine's website. "This will make it simpler for participants that already have a firm conducting an audit for ISO or other certification," Mr. Johnston said. "It will also enable remotely located companies to save money by using a local firm."

Mr. Hutton encourages anyone unhappy with an

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auditor's style to seek out a new one. "If auditors go to a company, introduce themselves and immediately starts rapid-fire questioning, it unnerves everyone, sometimes to the point where employees know the answers but are too stressed to respond," he said. "I always try to make everyone comfortable before starting because most people know their jobs and, if they're relaxed, they're usually better able to provide thorough responses, and then I only need to ask a few additional questions.

"And I'm very pleased to add that I've never had customers say they didn't want me back."



Photo: Fednav

The often negative connotations with the word *audit* have prompted LRQA to use the word *assessment* instead because the process is fundamentally an overall assessment of an enterprise's compliance and control vis-à-vis specific criteria.

Mr. Gagnon said it's wonderful to have an independent source confirm Fednav and FMT's environmental

initiatives. "We've never been shy about saying what we're doing in terms of improving our environmental performance, but this outside validation gives us greater confidence and credibility to do so," he said. "It will also add so much more overall credibility to the Green Marine program." ■

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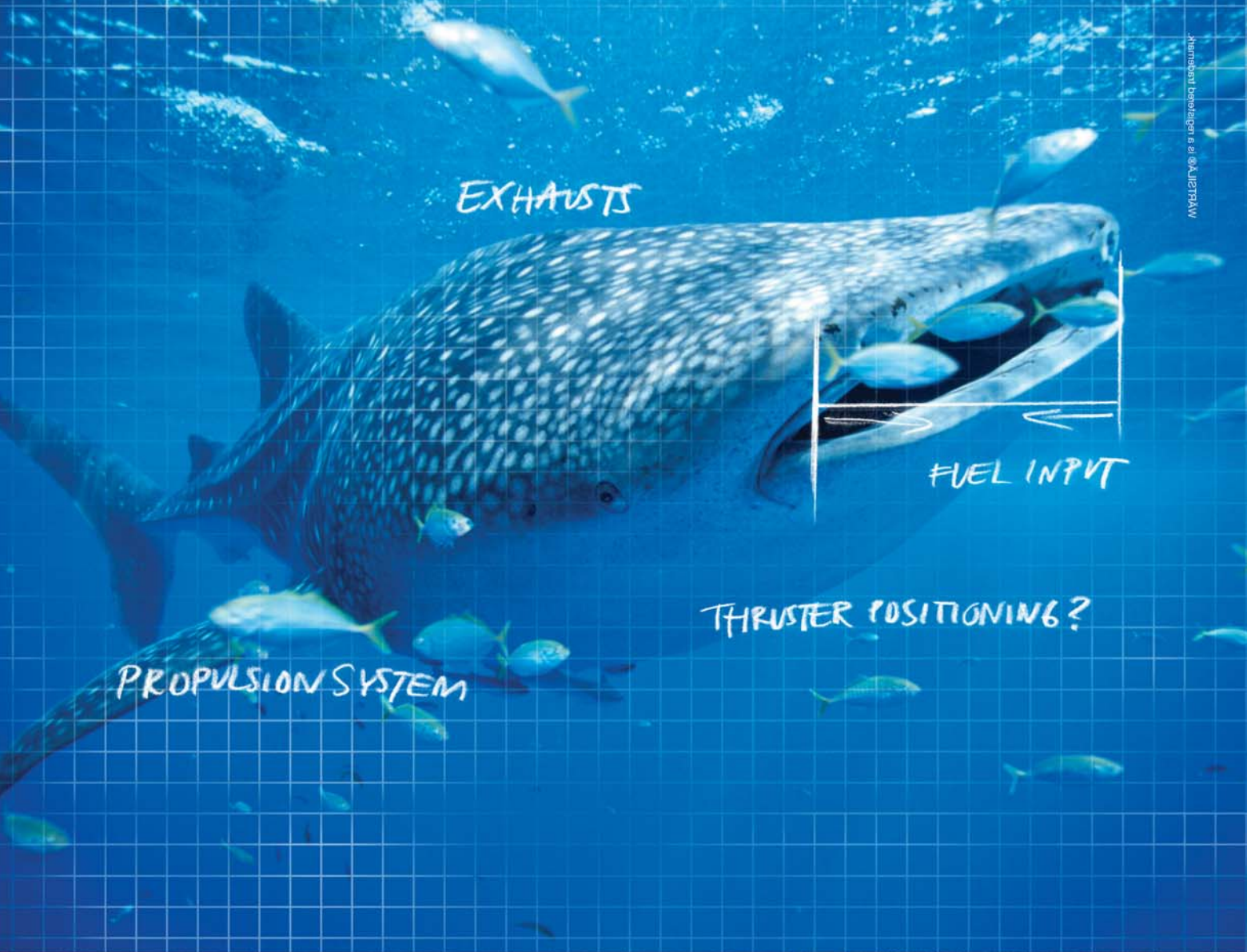












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PUSHING THE LIMITS FOR OILY WATER TREATMENT

Environmental issues are a growing concern for shipping companies all over the world. Although already one of the most environmentally forms of transport, there are still areas with improvement possibilities. One of these is the release of bilge water into the sea, an area where Wärtsilä is now among the leaders in promoting new technology and pushing the boundaries of what is deemed possible. The Wärtsilä Senitec M Series range of oily water treatment units guarantee a maximum oil content in the treated water of less than 5 parts per million and normally shows much lower values.

What makes the Wärtsilä Senitec M Series units unique is the ease of use, the completeness of design and safety for the operator and – above all – the fact that they surpass existing IMO and US Coast Guard demands with a wide safety margin. Currently, the IMO regulations stipulate that water being pumped overboard can contain a maximum of 15 ppm (parts per million) of oil. Some national regulations are even lower. The Wärtsilä Senitec units are guaranteed to produce a maximum of 5 ppm, and in actual cases the level is normally below 1 ppm.

If simple separators would work efficiently enough, Wärtsilä would not be in this business. However, achieving consistent high availability and low effluent oil discharges in the treatment of bilge and sludge is highly complicated. This is due to the complex composition of oil, chemicals, solids, rust and other fouling substances in the bilge water. This composition also varies over time, making techniques like coalescing and filtration unsuitable. Furthermore, stable emulsions in the oil are not handled by such technologies.



Principles behind the Wärtsilä Senitec M Series

The technology behind Wärtsilä Senitec M- and P-series is a combination of optimized traditional methods, and innovative new solutions. It consists of a four-stage, emulsion-breaking separator, where each stage handles one key component of the sludge and bilge mix. It can handle input flows with an oil content of between 0 and 100%, making it the most versatile separator on the market.

Stage 1: Dissolved air flotation and oil skimming

By a combination of dissolved air and a unique dual oil zone interface stage, the oil floats to the surface, where it is skimmed off and pumped to the waste oil (sludge) tank.

Stage 2: Emulsion breaking

The processes of coagulation and flocculation are employed to separate the suspended solids from, and break the emulsions in, the bilge water. Dispersed solids (colloids) suspended in the bilge water are stabilized by negative electric charges on their surfaces, causing them to repel each other. Since this prevents these charged particles from colliding to form larger masses, called flocs, they do not settle. To assist in the removal of colloidal particles from suspension, chemical coagulation and flocculation are required. These processes, usually done in sequence, are a combination of physical and chemical procedures. Chemicals are mixed with the bilge water to promote the aggregation of the suspended solids into larger particles. To achieve maximum effect, the mixing of the different chemicals must be performed with the utmost control. Once the suspended particles are flocculated into larger particles, they can be removed from the liquid by flotation.

Stage 3: Dissolved air flotation and sludge skimming

Dissolved air flotation is used again to promote the separation and subsequent removal of the solids to the solids tank. The open design of the system makes it easy to have full control and to maintain and run the unit with a minimum of effort.

Stage 4: Activated carbon filtration

The fourth stage consists of a traditional active carbon filter. This filter is only for final cleansing of the water before discharge. Field studies show that the water contains ~1 ppm before the filter, and less than 1 ppm after the filter. By minimizing the load on the filter the amount of water used for back-flushing is exceptionally low, which results in lower sludge volumes.

After these four stages, the oil content in the water is guaranteed to be below 5 ppm, while actual tests show it to be significantly lower. The solids in the solids tank can be processed and dewatered further through the use of a Wärtsilä Senitec SolidPac unit. The SolidPac unit is a filtration system, where the water content in dry solids can be reduced by as much as 90 percent, lowering costs for disposal and simplifying the solid waste handling process.

Decreasing costs and minimizing environmental impact

The return on an investment in a Wärtsilä Senitec M Series unit is easy to calculate for vessels visiting ports where sludge and bilge discharges are subject to charges. The reduction of both bilge and sludge volumes amount to significant reductions in discharge fees. In the actual case study shown below, a ro-ro vessel with a DWT of 9000 tons saved as much as 40 percent on sludge disposal and 92 percent on bilge. **See Table 1**

The total net savings were sufficient to enable a very short payback time based on the reduction in discharge fees alone. The reduction in need for manual labour, the increased safety margin towards IMO regulations and the increased safety in knowing that no accidental spills will happen due to the fail-safes built into the system can be considered a bonus.

The real winner, however, is the environment. The oil content in the discharged water is significantly less than with traditional systems. In addition, the Wärtsilä Senitec unit reduces a number of other components, which today are not governed by IMO or other international bodies, such as heavy metals and CODs (chemical oxygen demanding substances, meaning compounds that consume oxygen in a chemical process, one of the principal culprits for the "dead ocean floor" effect). **See Table 2 for actual numbers.**



Table 1

| | Actual values | Other market equipment | Wärtsilä Senitec M1000 + SolidPac |
|---------------------------|----------------|------------------------|-----------------------------------|
| Sludge | 360 ton/year | Reduction : 0% | Reduction : 40% |
| Bilge | 1 260 ton/year | Reduction : 45% | Reduction : 92% |
| Total to discharge ashore | 1 620 ton/year | 1 053 ton/year | 316 ton/year |

| | Guaranteed limit | Actual case study |
|----------------|------------------|-------------------|
| Oil and grease | 5 ppm | < 1 ppm |
| COD | 1000 mg/l | < 300 mg/l |
| Lead [Pb] | 0.05 mg/l | < 0.005 mg/l |
| Cadmium [Cd] | 0.0005 mg/l | < 0.00005 mg/l |
| Copper [Cu] | 0.5 mg/l | < 0.02 mg/l |
| Chromium [Cr] | 0.05 mg/l | < 0.005 mg/l |
| Mercury [Hg] | 0.0005 mg/l | < 0.0005 mg/l |
| Nickel [Ni] | 0.5 mg/l | < 0.05 mg/l |
| Zinc [Zn] | 1.0 mg/l | < 0.1 mg/l |

Table 2

What about the future?

Most people are aware that actions need to be taken to combat pollution. Oil dumped into the ocean is a great strain on our fragile environment. The awareness of the need to keep our environment healthy and clean is growing daily. Corporations, institutions, and national states are revising their environmental policies and guidelines, and imposing stricter limits and higher penalties.

In the treatment of oily water, the Wärtsilä Senitec solution represents the leading available technology. Already today it follows and surpasses all existing guidelines and limitations, and could actually help push these guidelines even further. Nevertheless, being the best is not, in itself, good enough. The principles behind the Wärtsilä Senitec technology are constantly being refined and developed, with one clear goal: zero pollution in the water.

FACT BOX 1

The Wärtsilä Senitec M Series range encompasses the M1000 and M2500 units, with capacity of treating 1 and 2,5 m3 of oily water per hour. Both units are certified according to IMO MPEC 107(49) and US Coast Guard US 46 CFR §162.050 and guarantee a resulting oil content in the treated water of less than 5 ppm, with real case levels being below 1 ppm during continuous operation. Together with the Solid-Pac add-on, the units can reduce the amount of bilge water for disposal ashore with as much as 95 percent.

The system can also be extended with Wärtsilä's Bilge-Guard™ bilge discharge monitor, which constantly oversees and monitors the oil content in all discharges overboard. Should the oil content rise above the set limit, the flow will be re-routed back to the bilge tank. The system logs discharge quantity and oil content as well as time and position of the vessel. All data is stored in memory for later retrieval.

FACT BOX 2

Coagulation is the destabilization of colloids by neutralizing the forces that keep them apart. Cationic coagulants provide positive electric charges to reduce the negative charge (zeta potential) of the colloids. As a result, the particles collide to form larger particles (flocs). Rapid mixing is required to disperse the coagulant throughout the liquid.

Flocculation is the action of polymers to form bridges between the flocs, binding the particles into large agglomerates or clumps. Bridging occurs when segments of the polymer chain adsorb on different particles and help particles aggregate. An anionic flocculant will react against a positively charged suspension, adsorbing on the particles and causing destabilization either by bridging or charge neutralization. In this process it is essential that the flocculating agent be added by slow and gentle mixing to allow for contact between the small flocs, and to agglomerate them into larger particles.

FACT BOX 3

First offshore installation up and running

The Transocean Polar Pioneer oil rig became the first offshore installation to be fitted with a Wärtsilä Senitec M1000 oily water treatment unit, replacing an older, obsolete system. After two months of operation, the crew aboard Polar Pioneer are very pleased with the unit, which has lived up to all the promises made initially. The rig treats between 6-10 m3 of bilge water each week, and the final oil content in the effluent is steadily below 1 ppm.

Originally we were a bit sceptic that the unit would be able to handle all different types of detergents and similar in the bilge, but so far it has exceeded our expectations. It is very effective and is showing low operating costs, says Alexander Nuncic, maintenance supervisor aboard Polar Pioneer.





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2010 conference
will broaden focus
to include more
academic research



Photos: Green Marine

Attendance at Green Tech 2009 surpassed the Green Marine management group's expectations with more than 130 delegates attending the conference held in Toronto last May. The number represents a 10-percent increase from a year earlier.

"We had a great response, which I think reflects how important an issue the environment has become for the marine industry, notwithstanding current economic conditions," said David Bolduc, Green Marine's co-ordinator.

"Our members realize that in certain cases they have to implement new technologies to attain the higher performance levels within our environmental program. And Green Tech is an ideal way to find out about the different technological solutions available or being developed to achieve Green Marine's objectives."

Some delegates told Mr. Bolduc they had no idea about one or two of the technological solutions available on the market until they saw the exhibits or spoke to other delegates. "So it proves this annual conference is a necessary tool for our industry, especially with things changing so rapidly," he said.

AN IMPORTANT FIRST

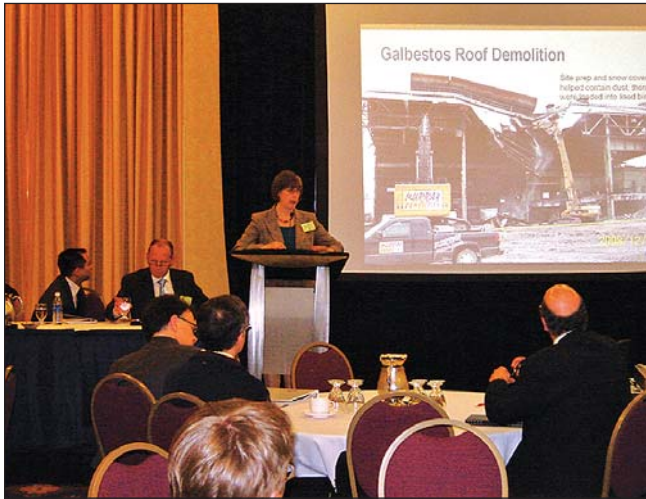
Green Tech 2009 held particular significance as

the first time Green Marine held a ceremony to mark the official certification of the 45 initial participants in the program. "We were very pleased to see representatives from more than half of the participants in attendance, especially since this was also the first time Green Marine revealed the participants' overall annual performance results," Mr. Bolduc said.

The annual conference provides an ideal venue for Green Marine's participants to share knowledge and experience, according to Marilyn Baxter, the Hamilton Port Authority's environmental manager and chair of Green Marine's Great Lakes environmental committee. "It's always good value to meet face to face because you find out very quickly what you have in common with other people and who might be helpful to you in your work," she said. "And you don't often have that kind of concentration of expertise in one place."

In one of two presentations, Ms. Baxter shared the Hamilton Port Authority's experience in demolishing a 2.4-hectare (six-acre) former steel rod mill containing various types of asbestos, PCB oil and other hazardous materials. "One of the things we did was strengthen communications between ourselves and the contractor by hiring a third-party engineer to be on site on a regular basis over the 10-month project so that we could





have the onsite knowledge to be able to address key issues with due diligence in a matter of hours instead of days,” she said. “We also hired a former employee of the mill as an onsite consultant.”

The staff of several other ports approached Ms. Baxter afterwards to ask how the Hamilton Port Authority dealt with specific challenges that their own ports would soon be addressing. “The immediate feedback I received told me that Green Tech really works,” she said.

COMMON ‘PORT-FOLIOS’

Green Tech 2009 was also a chance to sit down with many of the people in the employ of ports to discuss how to approach common environmental challenges. “The environment is a priority for everyone, but it quickly became clear that the size, staffing, resources, operations, tenants, ownership and management structure of ports can vary dramatically,” Ms.

Baxter recalled. “By discussing the differences, we were able to establish more common ground.”

Several port officials or staffers thanked Ms. Baxter and others for their work on Green Marine’s committees. “It was really appreciated what these committees on doing to determine feasible ways for large and small ports to work towards exceeding environmental compliance,” she said. “The committee’s recommendations make it easier and more efficient to make improvements because no one is reinventing the wheel or going off in the wrong direction.”

The direct feedback obtained at a Green Tech 2009 workshop helped to establish that storm water runoff, spill prevention and cargo residue were key concerns of ports and helped to form Green Marine’s new *Water and Land Pollution Prevention* criteria for ports and terminals.

“Green Tech is the best place to experience directly how Green Marine works so successfully with the representatives of larger companies willingly sharing with smaller companies how they’re going about reaching the program’s higher performance levels,” Mr. Bolduc said. “They’re actually sharing their inventory methods, templates and other tools so that everyone in the industry can benefit, which I think is unprecedented.”



Marilyn Baxter
Establish common ground



Marc Fortin
Share knowledge, experience

KEY GOVERNMENT SUPPORT

The conference’s importance is already recognized in some key corners of government. The province of Ontario and Transport Canada were among the sponsors of Green Tech 2009.

“One of the big roles of government is to spur innovation by serv-





ing as a knowledge broker,” said Marc Fortin, Transport Canada’s director general for Transportation, Technology and Innovation. “And Green Tech provides an excellent opportunity for the marine industry to share knowledge and experience, and for innovators to showcase new and developing technologies designed to address environmental challenges.”

A momentum is usually created as people discuss new possibilities at conferences such as Green Tech, he added, which often leads to new partnerships among the private sector, governments, and/or academia. “For example, there could be joint efforts in terms of research, which is something our department certainly wants to encourage,” he said.

Mr. Fortin envisions Transport Canada continuing to support Green Marine’s efforts, starting with a strong presence at Green Tech 2010. He also hopes to see more representatives from all levels and relevant departments of government at next year’s conference.

UNIQUE MARKETPLACE

Green Tech 2009 also provided an ideal venue for suppliers to the maritime industry. Thordon Bearings Inc., a manufacturer of grease-free bearings and deck equipment, was among the exhibitors at both Green Tech 2009 in Toronto and Green Tech 2008 in Montreal. Craig Carter, director of marketing and customer service, attended as a delegate both times.

“We really appreciate having one place where we can build relationships with the people directly involved in the industry, as well as with the relevant government departments and certification societies,” he said. “It’s great to be able to discuss the environmental issues and the new technologies available to deal with some of them.”

Mr. Carter also welcomed the opportunity at Green Tech conferences to hear about new issues and some of the early thoughts on how to handle them. “I particularly like the panel sessions because there’s more back-and-forth discussion about what the problem is and what the potential solutions might be,” he said. “It’s during

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these discussions that I find that the most exciting ideas and information emerge.”

As an active Green Marine partner, Thordon Bearings plans to participate in future Green Tech conferences. “From a purely marketing standpoint, it’s great to be able to show and discuss our products,” Mr. Carter said. “But, again, the most important thing for us has been the opportunity to develop new and mutually beneficial working relationships.”

BROADER RELEVANCE

Organizing a conference in Toronto when your offices are in Quebec City can be somewhat daunting. Mr. Bolduc said the pressure was eased somewhat thanks to the logistical help provided by the St. Lawrence Seaway Management Corporation. Martin Fournier of Passeport Maritime, a consulting firm specializing in maritime transport, developed the conference program as he did for Green Tech 2008 (the first such annual conference).

The 2009 conference was expanded appreciably from a year earlier to include topics of interest to not only to ship owners and operators, but ports and terminals. “We organized parallel sessions so there would always be something of pertinence to all of our participants,” Mr. Bolduc says. “And that’s definitely something we’ll do again next year.”

Green Tech 2010 will be held in Montreal next May 19 and 20. Passeport Maritime will again help Green Marine’s management group to determine and invite relevant presenters.

Last year’s conference placed a big spotlight on environmental products and services. A technological forum had two product developers present their ideas to obtain industry feedback before commercializing their products. “Transport Canada helped us to develop this forum and it’s definitely something we’d like to do again with more developers at Green Tech 2010,” Mr. Bolduc said.

EXPANDING HORIZONS

Green Tech 2010 will still feature new and developing technologies, but the organizers hope to broaden the focus to include more information about environmental case studies. “We’re hoping to attract a greater number of academics and their students, as well as environmentalists, so we can learn more about their efforts,” Mr. Bolduc said. “We’re also hoping the conference will give them more insight about the realities of implementing environmental improvements. A company might face having to invest massively in a new technology, even when it’s not always obvious that

such technology will work.”

Delegates at Green Tech 2010 will also have a chance to find out what has or hasn’t worked elsewhere. “We also want to widen our perspective by inviting speakers from outside the Great Lakes and St. Lawrence region – perhaps from Europe or other areas of the United States,” Mr. Bolduc said. “Green Marine is about sharing information about environmental efforts and we want Green Tech to reflect that goal.”

Choosing Montreal for next year’s conference is in keeping with Green Marine’s policy to alternate yearly between locations along the St. Lawrence River and the Great Lakes. “Green Marine covers a large geographic region so we want to make it as easy and affordable as possible for participants from different locations to attend Green Tech regularly,” Mr. Bolduc said.

The Green Tech 2010 website is already up at www.green-marine.org/green-tech-seminar/ and will be updated regularly. ■



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MARINE POWER REPORT

INVEST IN TOMORROW'S
EMISSION COMPLIANCE
TODAY.

One of the most frequent questions about MaK "M" series medium-speed engines is: "What assurance do I have that they will be capable of meeting exhaust emission rules beyond IMO/EPA 2?" So far there has been much subjectivity on this topic resulting in apprehensiveness towards new engine investment. Read the following – it explains how MaK "M" series medium speed engines will evolve through IMO/EPA 3 and beyond.

The second phase of the Emission Minimisation (EMI MINI) research project, a joint effort to reduce marine engine emissions, is nearing completion. Funded by the German government and involving leading diesel engine design experts, including Caterpillar Motoren, AVL Deutschland, L'Orange, WTZ Roßlau and the University of Rostock, the first phase of the project, EMI MINI I, ran from 2002 to 2005. That phase produced major building blocks for today's MaK Low Emission Engine (LEE) technology. The second phase, EMI MINI II, which has run from 2006 to 2009, has now almost been finished. This phase has placed special emphasis on optimising the Caterpillar Common Rail (CCR) system to allow for MaK emission levels 50 % below current IMO I regulations.

"The combined efforts of five experts in marine engine technology have borne fruit", said Dr Udo

Schlemmer-Kelling, Manager Research at Caterpillar Motoren in Kiel at today's Motorship Propulsion & Emissions Conference in Copenhagen, Denmark. "Beginning with comprehensive spray chamber investigations, we have not only improved the software tools to better understand the combustion process, but also set precise development targets for the injection system manufacturer, carefully verified results in a single-cylinder research engine and then combined it all in an advanced MaK LEE production engine. EMI MINI has proven that research and serial production can be linked in a highly efficient way", he declared.

A STRATEGY FOR EMISSION REDUCTION

Back in 2000, Caterpillar Motoren identified three emission levels for the MaK marine product to meet short to mid-term emission regulations. These were a

base line IMO I engine, an IMO-compliant engine with invisible smoke emissions and a Low Emission Engine which meets the expected NOx emission range of IMO II and is also zero smoke. In addition, the strategy favoured the enhancement of proven technology inside the engine, which has clear advantages in terms of cost, complexity and maintenance.

Since then, IMO I-compliant engines have become the norm, more than 80 MaK marine engines rely on Flexible Camshaft Technology (FCT) for invisible smoke, and the first MaK IMO II-compliant engines are already in service at sea. Thanks to EMI MINI I, the NOx emissions of these LEE engines have been reduced by 30%. To achieve emission levels as low as 50% below IMO I, however, additional research had to be carried out within the framework of EMI MINI II.

PERFECT PARTNERSHIP

The University of Rostock contributed a detailed investigation of injection spray parameters on a special test bench, yielding important data on how to optimise injection components for different fuel qualities. The knowledge gained from this has also been used by AVL to develop, improve and verify calculation models in their CFD-FIRE software, enabling Caterpillar Motoren to calculate and predict the combustion processes of MaK marine engines. In this simulation, the influence of the nozzle flow on spray propagation and droplet break-up and thus on the mixture formation, combustion and emission formation is readily apparent. It not only helps to reduce development time and costs but also allows viewing the chemical and physical processes inside the engine which cannot be achieved with current measurement techniques.

The results of spray investigation and simulation led to improvements in the single-circuit Common Rail system used on MaK marine engines.



Chemical Tanker Fure West powered by MaK M43C Low Emission Engine

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FCT Unit mounted on a MaK 8M32C LEE Marine Engine

L'Orange optimised the design of the electronically controlled injectors comprising nozzle element, pilot valve and oil-cooled solenoid. Special emphasis has been placed on multiple injection capabilities as a prerequisite for future emission reduction. Further tests with different rail pressures, injection parameters, compression ratios and charge air temperatures took place at WTZ Roßlau using their single cylinder research engine. Investigations have shown that by combining certain NOx reduction measures with Common Rail capabilities, i.e. variable injection pressure, variable injection timing and multiple injections, a NOx reduction of 50% compared with IMO I can be achieved with only a slight increase in fuel consumption and Filter Smoke Number (FSN).

VALIDATION AND OPTIMISATION

Parallel to the research, simulation and development efforts taking place at different locations, Caterpillar Motoren Kiel also carried out many real engine tests on a MaK 6M32C and a 6M20C engine, both equipped with Caterpillar Common Rail (CCR). On these engines different combustion chamber designs and compression ratios were verified. The Miller Cycle strength was gradually modified and combined with various Common Rail trims. For detailed investigations regarding functional safety, lifetime and wear of components, an additional test rig capable of marine diesel and Heavy Fuel Oil (HFO) operations was used.

For transient operation, it is very important to avoid visible smoke emission. The MaK engine concept for improved emission reduction combines the advantages of FCT and CCR to allow independent adjustment of the air and fuel systems during operation. The FCT system can switch on and off the Miller cycle, which influences the amount of trapped air in the cylinder. The CCR system can change the injection parameters during the acceleration process. As a result, smoke emissions are significantly reduced and remain below visibility at any given load.

The base line for all emission reduction measures was an IMO I serial production engine with a NOx cycle value of 11.7 g/kWh. Test-bed trials with the modified MaK 6M32C and 6M20C engines showed that the Miller Cycle is a suitable

tool for even further reduction of the NOx. The loss of peak cylinder pressure which this causes can be compensated for by an increased compression ratio, thus keeping efficiency constant. And when equipped with CCR and FCT, MaK marine engines can meet the requirements of IMO II without visible smoke.

THE WAY TOWARDS IMO III

Even though IMO II with 30% less NOx has been achieved, it became apparent that NOx values of 50% below IMO I were not achievable without penalties in terms of efficiency. Injection system trims like adapted rail pressures, timings and multi-shots were able to reduce the NOx cycle value by only about 10% below IMO II (40% below IMO I). Trimming the engine to 6g/kWh NOx (50% below IMO I), resulted in an efficiency drop of 2 to 3%. An increase in smoke emissions could be overcome by suitable injection trims. However, to achieve the given target of EMI MINI II, it was found that additional research was required.

Caterpillar Motoren carried out additional development and simulations. Higher compression ratios and a stronger Miller Cycle were the right tools for the NOx target of 6g/kWh. But a stronger Miller Cycle requires a higher boost which only can be delivered by a two-stage charging system. Also, for higher compression ratios a redesign of the cylinder head would be needed. Smaller and therefore more valves give the opportunity to reduce the valve lift without sacrificing engine breathing. A reduced valve lift permits an increase in the compression ratio without compromising the piston crown design. Combined, these measures not only keep efficiency constant even at 6g/kWh NOx, but also provide the basis for a further reduction to 2g/kWh NOx, and thus to IMO III requirements.



MaK 6M32C Marine Engine with Caterpillar Common Rail

SMALL IS BEAUTIFUL

EMI MINI has a clear mission and is narrow in scope: to reduce medium-speed marine engine emissions well beyond IMO I and IMO II, addressing IMO III.

And that's why EMI MINI involved only seven partners, each of them with proven expertise in one aspect of the overall emission reduction process.

The EMI MINI project underscored the huge potential of the current MaK medium-speed marine engine design. Introduced from 1992, the MaK long-stroke engine family comprising M20C, M25C, M32C and M43C has won a reputation for performance, reliability and fuel economy. With the latest findings it has become clear that this proven platform is also capable of meeting IMO III emission limits not expected until 2016. Customers enjoy peace of mind, knowing that MaK engines ordered today are based on technology which not only has been sold more than 4,000 times but will continue to be sold and further developed over the next decade and possibly even beyond that.

According to Schlemmer-Kelling, "The EMI MINI results and the present MaK LEE production engine guarantee the future of the MaK medium-speed, long-stroke design philosophy. I am confident that our technology approach, together with our in-house engineering expertise, will find suitable ways to cope with ever more-stringent emission regulations. That's why the seven project partners of EMI MINI I and II have already agreed to take part in a successor project named FAME (Fuel Air Management for Emission Reduction) starting in September 2009."

EDITOR'S NOTE

It is universally understood that sulphur compounds in engine exhaust cannot be mitigated or removed by engine combustion technology. The ability to continue burning high-sulphur fuels in emission control (ECA) areas will be dependent on off-engine devices such as wet and dry scrubbers. Your Canadian MaK dealers are closely monitoring scrubber technologies and effectiveness. We will actively co-operate with owners evaluating exhaust scrubbing devices offered by third-party specialist suppliers in advance of any ECA imposition.

Taking subjectivity out of engine investment decisions are what your Canadian MaK dealers are all about. Look to the future with us.

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West Coast: Finning Power Systems

Alan Novotny – 888-Finning
anovotny@finning.ca





PARTNERS BENEFIT from BETTER INDUSTRY KNOWLEDGE

Green Marine has 25 industry-related partners to date. That number is expected to increase steadily as shippers, agents, suppliers, researchers and developers, as well as non-profit organizations linked to marine activities, realize the advantages of teaming up with the environmental program.

“Becoming one of our partners is the simplest way to stay up to speed on what our participants are seeking in terms of environmental excellence for products, services, labour skill sets and new technology,” said Ray Johnston, Green Marine’s chair. “It puts us all on the same page in terms of Green Marine’s goals.”

At SNC-Lavalin Environment, air quality meteorologist Bryan McEwen immediately recognized the advantages in terms of obtaining more accurate information. “In the past, the federal government likely overestimated marine sector emissions because of a

lack of precise data,” he said. “Green Marine is taking us a major step forward by requiring all its participants to calculate air emissions in a detailed and consistent manner that will produce more reliable data.”

CONSISTENT PERFORMANCE METRICS

Uniform criteria are facilitating the development of computer software that will make it simpler for ports (regardless of their size and available resources) to collect data from ships and land-based vehicles and equipment on an ongoing basis.

SNC-Lavalin Environment is currently working with Transport Canada on developing a port emissions inventory model that Green Marine hopes will align with its own emission assessment requirements. Two of Green Marine’s participants – the ports of Sept-Îles and Hamilton – will test the model once it has been developed. “We’re hoping to complete these two pilot projects by the end of next March,” Mr. McEwen said.

*Insights leading to
improved technology and training*

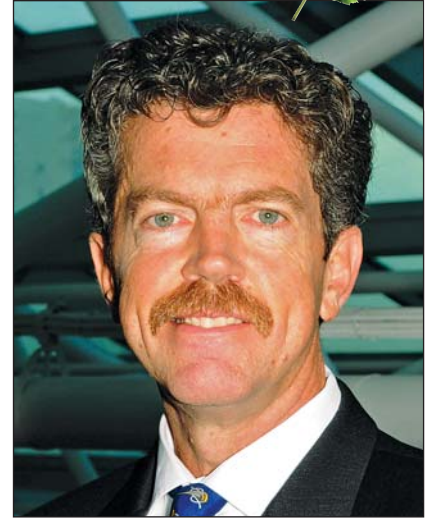




Bryan McEwen
Adhere to consistent environmental metrics



Claude Mailloux
Clear framework for environmental goals



Stephen Gumpel
Continue to enhance environmental performance

Earlier this year, SNC-Lavalin Environment was also involved in an emission assessment at the Port of Montreal (another Green Marine participant). “All this is coming about more quickly and easily because of Green Marine’s existence,” Mr. McEwen stressed. “Having this kind of organization whose members adhere to consistent environmental performance metrics removes many potential obstacles to environmental management.”

RELEVANT INSTRUCTION

As a major training and resources centre, the Comité sectoriel de main-d’œuvre de l’industrie maritime (Human Resources Sectorial Committee of the Maritime Industry) welcomes the opportunity to partner with Green Marine. “It’s important for us to be actively involved so that we always have a good idea of what the marine industry needs when it comes to environmental management education and training,” said Claude Mailloux, the CSMOIM’s general manager.

CSMOIM has conducted environmental management training sessions for the shipping industry over the past two years in Quebec City and Montreal. The seminars focus on how on to optimize the use of on-board equipment, fuel and other resources through proper maintenance and operating procedures. Other topics include the benefits of pilotage services, and efficient waste disposal and recycling.

In September, CSMOIM held its first two-day seminar in Quebec City on the environmental management of ports. “It dealt specifically with port-related activities such as managing storm-water runoff, optimizing traffic flow, eliminating idling and mini-

mizing noise and dust,” Mr. Mailloux said. “We had a full registration and will probably hold another session in Montreal soon.”

The course agenda was specifically devised with Green Marine’s port-related priorities in mind. Formerly at the St. Lawrence Economic Development Council – SODES (where the idea for Green Marine was originally incubated), Mr. Mailloux has been involved with Green Marine from the very beginning. He remains active on one of Green Marine’s environmental committees to stay apprised of new training requirements.

CLEAR FRAMEWORK

“Green Marine facilitates matters by providing a clear framework when it comes to the environmental goals established by the marine industry in the St. Lawrence and Great Lakes region,” he said. “It has also made it easier to find out what’s new in the way of technological products and services that might require additional training.”

The potential for better networking when it comes to future training also interests CSMOIM. “Now that all of Green Marine participants have established their environmental footprint, it’s an ideal time to ask if they have identified particular areas where they could perhaps benefit from additional or specialized training,” Mr. Mailloux said. “We’re certainly willing to discuss with a company whether our training programs could enhance their environmental performance.”

Such training could take place at a local school, on the company’s premises or through online courses. The curriculum could also be tailored quite specifically,





depending on the level of demand. “This is new territory for us, too, and quite exciting,” Mr. Mailloux said.

That excitement has CSMOIM intent on remaining an active Green Marine partner. “We want to be a real part of the solution in terms of helping Green Marine participants to improve their environmental performance through additional and specialized train-

ing,” Mr. Mailloux said. “As a member of the maritime community, it only stands to reason that we want to do our part and participate in this impressive initiative.”

INFORMATION AND IDEAS

The chance to regularly exchange information and ideas is what Stephen Gumpel, vice-president for

North America at Germanischer Lloyd, appreciates the most about partnering with Green Marine.

As a founding member of the International Association of Classification Societies, Germanischer Lloyd brings 143 years of expertise in numerous areas – most recently in environmental matters – to the discussions.

“Being a Green Marine partner fits with Germanischer Lloyd’s policy to keep a two-way flow of communication with our client base: sharing a lot of what we know with the industries we serve while learning from those same people,” Mr. Gumpel said. “Green Marine is helping us to find out directly what ship owners and operators are facing in terms of environmental challenges and what they need to continue to enhance their environmental performance.”

As a volunteer on a Green Marine technical committee, Mr. Gumpel meets regularly with participants and other partners. “These meetings are different from when you meet one-on-one with a client and it’s your job to focus specifically on that customer’s needs,” he said. “Having more people at the same table creates greater opportunity to learn from each other and expand on ideas, which is one of the great benefits of Green Marine.”

GOOD FOR BUSINESS

Talking bottom line, Mr. Gumpel says being a Green

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Photo: Nick Cordeiro, Wikipedia

Marine partner is obviously good for business. “Green Marine is affording us the opportunities to make our range of services better known to more people within the maritime industry and that’s already paid off in terms of more dealings with several companies within

the Great Lakes and St. Lawrence region,” he said.

Germanischer Lloyd has saved Green Marine participants both time and effort by serving as an effective liaison. “For instance, the discussions we’ve had with American manufacturers of diesel engines are something we’ve been able to convey to Canadian and U.S. end-users participating in Green Marine,” Mr. Gumpel said.

The committee sessions are further informing the dialogue elsewhere. “As part of the International Maritime Organization’s working groups around the world, Germanischer Lloyd is at the forefront of advising governments, especially when it comes to emission standards for MARPOL Annex VI,” Mr. Gumpel said, adding that Green Marine has helped Germanischer Lloyd to understand the unique challenges facing ship owners and operators within the St. Lawrence and especially the mostly land-locked Great Lakes.

BRINGING NATIONS TOGETHER

“First of all, they’re facing different ballast-water regulations by various government levels,” Mr. Gumpel said. “And, secondly, we’re talking about freshwater vessels that are much older and operate in quite different conditions that most blue-water fleets – all of which affects how ship owners can respond to the requirements of MARPOL Annex VI.”

The challenges of retrofitting an older fleet and operating under shorter time constraints within freshwater are part of what Germanischer Lloyd is relating from the Green Marine discussions to the IMO and relevant governments.

“One of the things I particularly like is how Green Marine is bringing together the United States and Canada at a time of some pretty heated discussions about the future of our environment,” Mr. Gumpel said. “Borders mean nothing when it comes to the environment, particularly when you’re talking about such ecologically important waterways.” ■

The Federation has been an active contributor to the Green Marine initiative and views the development and implementation of this program as a major environmental achievement.

The Shipping Federation of Canada congratulates Canadian Sailings and Green Marine on this first edition of *Green Marine Magazine*.

In addition to its involvement in Green Marine, some of the Federation’s other efforts to address the marine industry’s environmental footprint and protect the marine environment include:



- Targeted training sessions and operational guidelines to help shipowners comply with environmental regulations
- A code of best practices for ballast water management which is recognized as an industry standard and incorporated into both U.S. and Canadian legislation
- A code of best practices for managing oily water waste in ships’ engine rooms
- A web-based “environmental toolbox” which provides members with a comprehensive library of documents, forms and background information on key environmental issues
- The establishment of collaborative relationships with industry stakeholders, governments and environmental groups to find workable solutions to environmental challenges

For more information on the Federation’s environmental policies and programs, please contact: Caroline Gravel, Director, Environmental Affairs, at cgravel@shipfed.ca

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COMMUNITY ORGANIZATION GAINS INSIGHT

as a result of Green Marine

Photo: niemac.ca

Les Amis de la vallée du Saint-Laurent (Friends of the St. Lawrence Valley) is among the environmental and community organizations that have become Green Marine's official supporters.

"Green Marine must be congratulated for thoroughly doing its homework on the environmental issues, crystallizing its goals, and bringing about radical change within a few short years," said Alexandre Archer, director of projects. "The best practices, technologies and equipment that many of the participating companies are now implementing to reduce their environmental footprint are quite remarkable."

For more than 20 years, Les Amis has championed the interconnected environmental, social and economic values of the St. Lawrence River. "We recognize the maritime industry's pivotal role historically and going forward as an economic driver and potential tool for additional development, but this must be done with an utmost respect for the environment," Mr. Archer said. "We now think more than ever that Les

Amis can work with Green Marine to discuss problems and come up with solutions."

NEW OPENNESS

A key difference, as far as Mr. Archer is concerned, is the openness that Green Marine has fostered within the maritime industry. "There seemed to be a closed-door policy for many years, and it resulted in a

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bad public image,” he said. “But now we clearly see the environmental initiatives that leading companies are taking to become among the best corporate citizens.”

Green Marine’s transparency is resulting in its participants being recognized worldwide as environmental leaders, Mr. Archer added. “We’re being made aware of the exact investments that maritime companies are making to become less polluting and more energy efficient,” he said. “This is a giant step in the right direction with companies realizing the importance of protecting the resources that keep them in business and establishing a favourable reputation in order to have good people want to work for them.”

PART OF THE SOLUTION

The opportunities for expansion and development are immense along the waterways into North America’s heartland, Mr. Archer said, but progress must be achieved with environmental protection that’s irreplaceable. “Our economy needs to adapt to serve the environment rather than the other way around,” he emphasized. “The maritime industry could be a big part of that solution as we move away from just-in-

time delivery modes that are ecologically harmful to greener transportation methods.”

Being involved in Green Marine has given Les Amis a better understanding of the financial investment, time and complicated logistics required to make some technological improvements, but also what might be done relatively simply and inexpensively.

“It’s unbelievable that many ports still don’t have cold-ironing facilities for ships to plug into electrical power while they’re docked,” Mr. Archer said as example. “There’s still a lot that ports, terminals, shipping companies and others within the industry can do and we’re optimistic about that happening faster with the Green Marine program.”

So Les Amis de la vallée du Saint-Laurent applauds Green Marine and its participants for the impressive progress to date, but will remain vigilant as an official supporter to ensure the program moves forward at full steam.

“We all profit from a maritime industry that’s efficient, competitive and respectful of the environment,” Mr. Archer said. ■

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▲▲ ABOVE AND BEYOND ▼▼

One of the neatest things resulting from Green Marine is the unique initiatives that many participants are undertaking as part of a new or renewed leadership role when it comes to the environment. Here are a few examples:

CSL invited Fisheries and Oceans Canada (DFO) scientists to examine ballast water for non-indigenous species during the Birchglen's transatlantic voyage earlier this fall. "Two scientists came aboard to do frequent sampling of the ballast-water tanks during the 20-day journey," said Caroline Denis, CSL's environmental co-ordinator. "They had a portable lab to measure the species and micro-organisms in the water before and after a ballast exchange at different locations."

In terms of air quality, CSL has collaborated with Environment Canada to identify and measure the exhaust emissions from two of its vessels. For a week, it provided Environment Canada with access to the

Atlantic Huron and Paul J. Martin, along with technical assistance and accommodations. Scientists from Environment Canada's Emissions Research and Measurement Section used their equipment on board each vessel in October to gauge the exact types and amounts of exhaust emissions produced by each ship's engines and their specific use. "The samplings will help us to validate and improve our air emissions inventory," Ms. Denis said. "It will also help us to maintain a good working relationship with government authorities, which should help to assure that future regulatory proposals are based on the realities of the maritime industry operating in the Great Lakes and St. Lawrence waterways."

The study is also determining any discrepancies in



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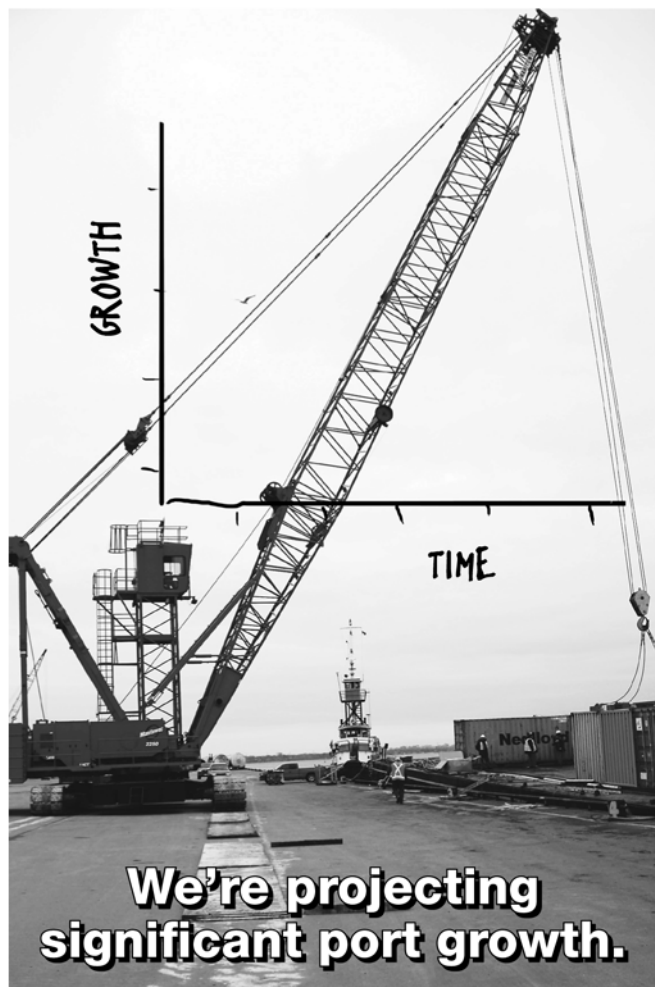
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using different established sampling methodologies. These include the U.S. Environmental Protection Agency's Method 5 to determine particulate matter emissions from stationary sources, the EPA's procedure for large compression ignition engines, the International Standards Organization's method 8178 for gaseous and particulate exhaust emissions, and the Portable Emissions Measurement Systems for road heavy duty diesel engine applications.

Fednav has implemented a zero-discharge policy for cargo residue in the St. Lawrence and Great Lakes.



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"We realized after doing our Green Marine inventory that we could make this positive change for

the environment," said Marc Gagnon, director of government affairs and regulatory compliance. "I think our company is among the first – if not the first – with a policy that nothing is swept overboard in these waters." The policy required a change in mindset and day-to-day procedures, but is going extremely well, he added. "Any discharge would now appear in red in our inventories and immediately be investigated."

The **Hamilton Port Authority** has stepped up its anti-idling and energy conservation communications with staff, emphasizing the benefits of improved air quality and energy savings. Surveys, for example, are posted on the company Intranet and "toolbox talks" include reminders and discussions about implementing best practices. The port authority plans to write and implement an energy conservation and best practices strategy in 2010 based on a benchmarking pilot project that it's doing on air quality and measurements in conjunction with Transport Canada.

Montreal Gateway Terminals Partnership is distributing a monthly newsletter by e-mail to its employees. Éco-Journal has the latest information about the company's Green Marine and ISO 14001 efforts, as



well as what they can do individually to create a greener planet. "Everyday actions can be as important as big initiatives in the long run," said Pierre-Luc Bastien, the company's eco-consultant. "Éco-Journal provides information

to make it easier to know how to make a difference." Issues have included details on carpooling, cycling or taking public transport to work, and significantly reducing and recycling lunch waste. "We can see the difference in our cafeteria," Mr. Bastien noted. Employees are invited to provide feedback and suggest other ideas. "We believe that staff participation at all levels and in all functions leads to environmental performance improvement," Mr. Bastien said.

The **Port of Milwaukee** is replacing the exhaust system on its six heavy forklifts.

The new system will considerably reduce engine emissions. A grant from the U.S. Environmental Protection Agency is covering the cost.



THE PORT OF MILWAUKEE





▼ GLOBAL EFFORTS ▼

While the current focus of Green Marine is on the St. Lawrence and Great Lakes region, it is important to recognize that similar efforts are being made by the maritime industry throughout North America and globally. Here are some examples:

Port Metro Vancouver expects to reduce carbon dioxide emissions by 3,000 tonnes (3,307 US short tons) next year with 57 cruise ships expected to plug into the new shore-power facility at Canada Place. A total of 14 connections were made during the 2009 cruise season. Officially launched in September, the

facility is the result of a C\$9-million project involving the Government of Canada, the British Columbia Ministry of Transportation, Holland America Line, Princess Cruises, BC Hydro and Port Metro Vancouver. It is the first installation of its kind in Canada.

Maersk Line has emphasized slow steaming to significantly reduce its consumption of bunker fuel.

Eivind Kolding, Maersk's chief executive, is aiming for a 20-per-cent reduction in bunker fuel use by 2012.

The new target is in addition to the 15-per-cent decrease that Mr. Kolding said Maersk has already reached this year. Mr. Kolding estimated that the reduction at October's fuel-price levels would save Maersk half a billion dollars US annually – proving yet again that conservation is good for the environment and business.

Global ports operator **APM Terminals** is aiming to cut its carbon dioxide emissions by 15 per cent for every TEU container it handles. The CO₂ savings would be significant with APM Terminals operating a global network involving 48 ports in 34 nations. The goal is to decrease the amount of CO₂ per TEU from 17.5 kilograms (38.5 pounds) in 2007 to 14.96 kg (32.9 lbs) in 2012. A combination of benchmarking, strategic investments, operational improvements, shared best practices and energy-saving logistics will be used to attain the goal within three years. Terminal procedures and environmental performance standards will be updated to surpass local and national regulations.

Teekay has received the Clean Shipping Award 2009 for its efforts to reduce greenhouse gas emissions. Nor-Shipping selected Teekay for its work in developing a technology to reduce the volatile organic compounds from the small amount of gas retained in crude oil. The gas is prone to escape dur-



Photo: Port Metro Vancouver





ing the oil's discharge to and from tankers and during transport. "Tests have shown that emissions are limited if oil is transported at a pressure equal to or higher than the last production stage separator," said Hans Richard Hansen, Teekay's vice-president of technology development. "The new systems, which have increased cargo tank pressure, were successfully tested on our

shuttle tanker Navion Hispania and found to be suitable for a general application on oil tankers." The new systems will be implemented on Teekay's four Great North shuttle tanker newbuilds, which will be the most sophisticated vessels of their kind ever made.


The **Port Authority of New York and New Jersey** has devised a Clean Air Strategy with its partners. The

strategy details practical actions that port and industry stakeholders can take to reduce diesel and greenhouse gas emissions prior to any potential regulations. The steps are expected to reduce GHG by five per cent annually, and nitrogen oxide and particulate matter by three per cent. Actions include a year-round vessel speed reduction incentive program for ships approaching the harbour, the installation of shore-power facilities at the Brooklyn Cruise Terminal, the installation of new engines with diesel particulate filters on two wharf cranes, testing hydraulic and electric hybrid yard hostlers, and developing an appointment system for trucks serving the terminals, including a fast lane at the gate for newer (2004 and younger) vehicles.

Overall pollution at the **Port of Los Angeles** was decreased by 25 per cent between 2005 and 2008 as a result of its Clean Air Action Plan. Diesel soot was reduced by one-third. The reductions were achieved despite a five-per-cent increase in box volume. Sulphur oxides dropped by 32 per cent, while nitrogen oxides were 18 per cent lower.

The Orcelle Fund established by **Wallenius Wilhelmsen Logistics** is seeking to help innovative projects involving alternative maritime energy sources or more efficient energy technology. The fund provides seed capital to commercially viable projects and has so far awarded two US\$25,000 grants. One of the grants is to support research into a fin propulsion

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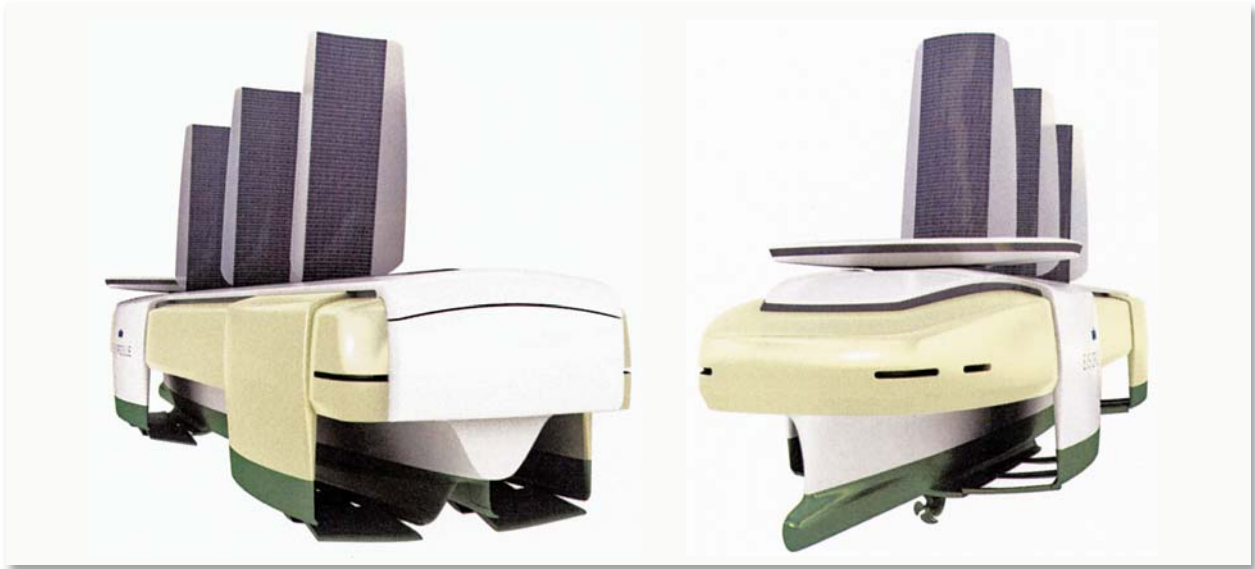
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method based on penguin movements. The fund is named for the E/S Orcelle, which is WWL's concept for an ideal car carrier by 2025. The design calls for the use of wind, sun and waves as well as fuel-cell technol-

ogy as the carrier's renewable energy supplies. WWL is aiming to introduce some of these elements to its vessels in the near future.



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