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# Adapting to the New Marine Fuel Supply Chain

## *Compliance Issues Surrounding Evolving Environmental Regulations*

By Bruce Abbott

The shipping industry is undoubtedly facing some of the most significant challenges in its history. But, despite the current difficult climate, it is critical that there is also focus on the future, and the impending regulatory challenges that will serve to transform the industry; in particular, the MARPOL Annex VI regulation, which limits the sulphur content in marine fuels. Its impact will be seismic and will affect every stakeholder within the shipping supply chain, from shipowners and operators to charterers and fuel suppliers.

The results of CE Delft's fuel availability study were expected to be made public in October of this year at the IMO's Marine Environmental Protection Committee meeting (MEPC 70), which would determine when the regulation would be implemented, in either 2020 or 2025. However, leaked documents to the media suggest the research finds

no substantial reason why the cap cannot be introduced in 2020 because there are no "major barriers" to producing enough compliant sulphur fuel. The clock is therefore ticking, and it leaves just over three years for the industry to adapt to a completely new marine fuel landscape. There is no time left for shipowners and managers to leave their heads in the sand. With heavy fuel oil (HFO) comprising the majority of fuel supply, it is hard to overestimate the impact this cap will have on the industry and the future makeup of the marine fuel supply chain.

But how can shipowners and operators adapt to this situation, and how can they ensure compliance at the same time as protecting their margins? This is the question facing the global commercial fleet, as well as charterers, the majority of which pay the fuel bills. In reality, there are three so-



*A view of Genoil's GHU.*



(Top) The GHU design test facility at Two Hills in Alberta, Canada. (Bottom) The GHU compressor room in the test facility.

lutions for compliance: distillates/distillate-based products, HFO with scrubber technology or LNG. In order for LNG to become a truly viable solution there needs to be some significant investment regarding infrastructure and bunkering standards; it is a medium- to long-term solution and is unlikely to solve demand issues in the early 2020s. Scrubbers are a more viable option, however they require significant upfront capital investment, which has slowed uptake due to the lack of liquidity within the market. Distillates, and distillate-based products will therefore prove to be the most popular and widespread compliance solution. However, this causes significant challenges; first, the increased cost of using distillates will significantly impact profitability, and second, despite the lack of a major barrier to supply, barriers nevertheless exist, and there needs to be assurance that there will be enough quality, compliant products.

Despite the forecasted rise in demand, some refiners are reluctant to invest the significant capital required to reconfigure their refineries to produce more distillates. They are also lacking a cost-effective way to remove the sulphur from fuel oil or refinery residues, and at the moment there is little incentive for them to develop such a method—after all, high distillate prices will increase their profit margins further, increasing the incentive for refiners to use all the capacity they currently have for distillate production to manufacture these premium products, rather than looking to remove sulphur from HFO.

### Fuel Prices

On top of this, there is also uncertainty over the future price of distillate fuels. There is a level of apathy within the market at the moment, as distillates cost less than heavy fuel oil did two years ago, when the talk of the 0.1 percent Sulphur Emission Control Areas (ECA) went hand-in-hand with concerns over shipowners going out of business with fuel bills rising to unsustainable amounts. The dramatic drop in crude prices put an end to this. However, what may happen over the next four years (if the global 0.5 percent ECA is implemented in 2020) is far from certain.

There is still uncertainty about the trajectory of crude prices. The much-anticipated Doha meeting in April 2016 between OPEC and non-OPEC oil producers failed to resolve output issues, yet crude still hovers, at the time of writing, around the \$50 per barrel mark. Indeed, there is every indication that the global oversupply of crude is diminishing, paving the way for higher prices by the end of the year. The U.S. Energy Information Administration reported that output reduced by 90,000 barrels per day (b/d) in March 2016, with total output for the year anticipated to slip to 8.6 million b/d from a peak of 9.7 b/d. With the global glut slowing, and with China's oil consumption rising 7.5 percent year on year (albeit fueled by credit), there is a chance that crude prices could strengthen. Indeed, the conventional wisdom suggests that come 2020, crude prices will strengthen and be higher than they are today. The International Energy Agency (IEA) forecast in May 2016 that crude prices will rise to circa \$77 per barrel by 2020 as supply and demand balance each other out. Clearly, this will have an impact on distillate prices. While they won't hit the highs of \$1,000 per tonne, which was the catalyst for predicting Armageddon for shipowners on the implementation of the 2015 ECA regulations, they will certainly hit a point that hurts and impacts profit-

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### Hydroconversion Upgrader

In conjunction with this, we can also be sure that the differential between HFO and clean fuels will also be greater, as refineries look to continue to offload their byproduct into the only viable market for it. While this will most likely increase the demand for scrubbers, there is also a significant opportunity for a low sulphur-based product that meets compliance requirements and can be produced at considerably less cost.

This is why Genoil, a publically traded clean technology engineering company, has developed the Hydroconversion Upgrader (GHU) and introduced it to the marine market.

The GHU converts heavy crude oils and refinery bottoms into clean burning fuels for transportation industries, including shipping.

Genoil's innovation builds on existing and proven fixed bed reactor technology, which accounts for approximately 80 percent of the world's reactors. However, the GHU takes it to new heights by supersaturating the carbon molecules with hydrogen, significantly increasing the desulphurization, dematalization and denitrogenation conversion rates, and increasing operating efficiencies by 75 percent. In the context of the shipping industry's global sulphur cap, the GHU technology can take refinery residue and turn it into low-sulphur fuel oil to meet the 2020 legislation.

Critically, the GHU enables Genoil to produce compliant fuel at a much lower cost than oil refiners, as well as alleviating the industry pressure on any short-term distillate supply challenges. This has benefits for all stakeholders within the marine fuel supply chain. For shipowners, it negates the requirement to invest capital in abatement technology or switching to LNG. For fuel payers, it facilitates access to cheaper, compliant products, reducing fuel bills and increasing profitability. And for fuel suppliers, it ensures a continual supply of compliant fuel oil, which they can provide to customers at a reduced cost, but at a higher margin than traditional distillate or low-sulphur products.

The benefits also spread to ports. In a highly competitive market, port authorities can increase their attractiveness by ensuring the continuous supply of ECA-compliant, cost-effective fuel products, delivered through a state-of-the-art bunkering infrastructure. Genoil's GHU unit can be easily placed in locations such as receiving terminals, pipelines and ports.

While the fixed bed reactor as the foundation of the GHU technology is proven, and common to 85 percent of the world reactor market, the shipping industry is still traditionally skeptical when it comes to innovation. The lack of the widespread uptake in clean technologies that increase operational efficiencies is evidence of this. That is why Genoil has invested over \$50 million in research and development from its 147-acre site in Alberta, Canada, delivering an abundance of test data to verify the viability of the product. The company has also filed over 20 patents in relation to its GHU technology, including the process for treating crude using hydrogen in a special reactor unit.

Most significantly, credibility is often measured by the company that you keep. That is why in 2015 Genoil signed a \$700 million joint venture with the Chinese government refining operator, Hebei Zhongjie Petrochemical Group (HYT), marking the formal commercialization of the company and its technology within a large-scale refinery. And more recently, in April 2016, Genoil announced, in conjunction with consortium partner Beijing Petrochemical Engineering Co. Ltd. (BPEC), the receipt of a \$5 billion letter of intent (LOI) for the funding of a 500,000 b/d desulphurization and upgrading project located in the Middle East. Beijing Petrochemical is a division of Yanchang Petroleum, sitting at position 380 on the Fortune 500 list. This is a project that will see, following the implementation of the GHU technology, a production capacity of 500,000 b/d of low-sulphur crude oil. The level of financial backing that Genoil has received strengthens its position and confirms its capability to supply low-sulphur fuels to the shipping industry in preparation for the new regulation in 2020.

### Conclusion

There's no doubt the global sulphur cap will present the shipping industry with challenges, and it has already begun to add significant complexity to the marine fuel supply chain. If crude and distillate prices do rise, we will see a speedy reversal in the current state of apathy, and no doubt, a preregulatory panic, like the one that swept the industry in the build up to the 2015 ECA. The good news is that there are solutions out there that are developed, well-established and proven. Critically, plans and strategies for compliance still need to be developed in the short term. Companies that achieve this will seize significant competitive advantage and reap the rewards for years to come. As an industry, we can't afford to wait any longer before addressing the compliance issues of the future; they will be upon us before too long. **ST**

*Bruce Abbott is president and chief operating officer of Genoil Inc. and a member of the company's board of directors. He oversees the corporate direction and strategy for Genoil's global sales, support, consulting, marketing, alliances and opportunities. He has implemented new strategies that have led the company to the signing of a \$700 million contract in China, an EPC agreement with Beijing Petrochemical Engineering (which guarantees the Genoil process and projects to clients), and a recent \$5 billion LOI from one of the largest banking institutions in China.*

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