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# SIGTTO

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# SIGTTO NEWS

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## MESSAGE FROM GENERAL MANAGER



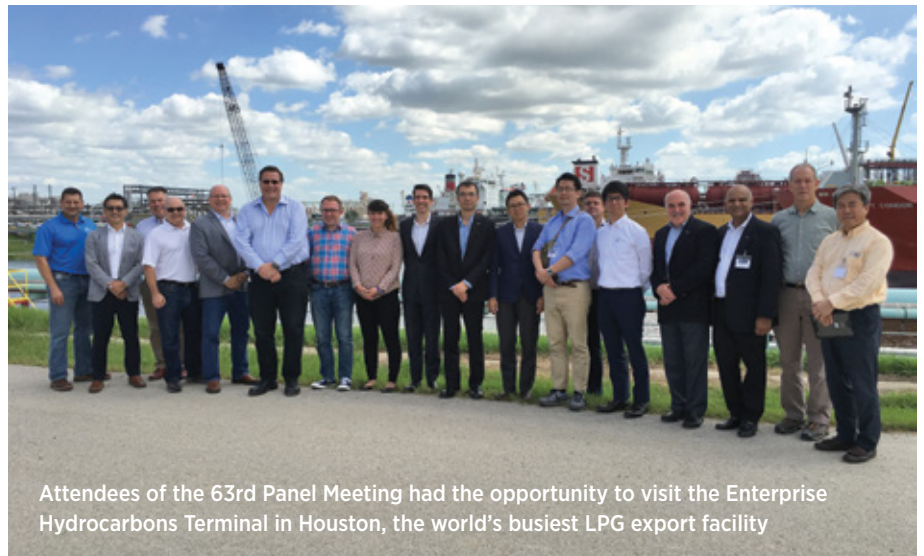
### SIGTTO extends its outreach

Andrew Clifton, the SIGTTO General Manager, reflects on how the Society's busy schedule of 2017 meetings has reached out to industry

SIGTTO has had a busy year to date. So far in 2017 five Regional Forums and a Panel Meeting have been held, along with two gatherings each of the General Purposes and Human Element Committees (GPC and HEC) and the Board of Directors' spring meeting. Still to come this year are the autumn Board and Annual General Meetings, four Regional Forums and the Liquefied Gas Senior Executive Forum that SIGTTO is hosting in Houston in December in tandem with the US Coast Guard (USCG) and the Society for Gas as Marine Fuel (SGMF). Now in its third year and extremely popular, the latter gathering is now an annual event in the Texas energy capital.

The Society was in Tokyo for the 75th GPC Meeting and the Gastech 2017 conference and exhibition this past April. I had the privilege of once again chairing the Gastech Shipping Session. This year's event was one of the biggest ever, with a huge attendance and impressive exhibition. We look forward to the next Gastech, in September 2018 in Barcelona, where SIGTTO and Witherbys, our publishers, intend to share a much larger exhibition stand.

SIGTTO's own major event in 2017 was the 63rd Panel Meeting which took place in Houston on 4-5 October. Kindly hosted by GTT Training, the two-day get-together featured a number of timely and illuminating presentations on



Attendees of the 63rd Panel Meeting had the opportunity to visit the Enterprise Hydrocarbons Terminal in Houston, the world's busiest LPG export facility

**“The General Purposes Committee members agreed that the topic of floating storage and regasification units (FSRUs) should be the subject of its own focus group.”**

technical issues that are presently the focus of industry attention. Several of these papers are highlighted on page 6.

The Houston Panel was a memorable occasion. The good attendance and quality presentations were augmented with technical visits to the Enterprise Products Partners (EPP) LPG terminal on the Houston Ship Channel and the Freeport LNG facility in Freeport, Texas. EPP is a new SIGTTO member and the capabilities of its recordbreaking LPG and ethane export terminals in Houston are described on page 11.

Freeport LNG commenced operations

in 2008 as an LNG import terminal but the current construction of three liquefaction trains at the site is providing the terminal with a bi-directional capability. Freeport LNG expects to commence LNG exports in late 2018 and is seeking permission to build a fourth train.

SIGTTO's Regional Forums continue to deliver interest and engagement with the membership at a more local level. In April 2017 Warsash Maritime Academy kindly hosted the European Regional Forum on its campus and the >

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## MESSAGE FROM GENERAL MANAGER

> proceedings included an opportunity to interface with the training establishment's liquefied gas handling simulators.

Three Regional Forums were staged in June this year. These were the spring Pan American Regional Forum in Houston, hosted by Mitsui OSK Lines (MOL), the Mediterranean Regional Forum in Athens hosted by Naftomar and the Singapore Regional Forum hosted by Singapore LNG. All were very well attended and participants engaged in in-depth discussions which covered a range of issues.

The South American Regional Forum was held in Buenos Aires in early September and, once again, was kindly hosted by YPF. At 110, the attendance at last year's Buenos Aires meeting set the record for a SIGTTO Regional Forum. Records are made to be broken, as they say, but the South Americans appear determined to hang on to it. A total of 118 delegates signed up for this year's event. The South American Regional Forum once again included a technical visit to the Escobar LNG import terminal near Buenos Aires which is based on the use of a floating storage and regasification unit (FSRU).

As mentioned, SIGTTO, the USCG and SGMF will be hosting the upcoming Liquefied Gas Senior Executive Forum in Houston. We will be gathering for the Forum in December and on this occasion Riviera Maritime Media will assist with coordinating proceedings. This annual event has built a momentum of its own in a short space of time, not surprising considering the current surge of interest in not only US exports of LNG, LPG and petrochemical gases but also the use of LNG bunkering in North America. The upcoming Senior Executive Forum is expected to be another very well attended event.

Participants in the 76<sup>th</sup> GPC meeting in Houston in October 2017 took the opportunity to examine the Committee's strategy in more detail. The appraisal resulted in several important decisions regarding SIGTTO's future organisation, prioritisation and responsibilities as well as the issues to be addressed. An improved structure will be implemented as a result of these decisions in order to achieve productivity and efficiency gains for the Society.

One topic that GPC members agreed should be the subject of its own focus group is FSRUs. More details and information about this new initiative will be provided over the coming year.

The autumn 2017 Board and Annual General Meetings will be held in Copenhagen in November, and Evergas is kindly hosting proceedings. The topics

to be discussed and, hopefully, agreed at the AGM, including the GPC 76 decisions, will be covered in the next newsletter.

The Human Element Committee met for the third time (HEC 3) in August 2017. The new group is dealing with human element issues as they relate to the gas shipping and terminal sectors. These issues include, but are not limited to, competency and training, design and ergonomics and the human element side of incident investigation. Further information on HEC 3 is given on page 5.

I wish to mention three key figures in our industry who unfortunately passed away since the last edition of SIGTTO News appeared. The first, Faizul Ismail of MISC, was a SIGTTO director at the time of his passing. Faizul was well known and respected in the industry and he left us too early at the age of 56. A very supportive director, he put forward many sound initiatives which SIGTTO has included in its 2020 Strategic Plan.

The second notable departed figure is Kjell Kvamme, who sadly passed away at the end of May. Kjell retired from Höegh LNG in 2015 after many decades in LPG and LNG shipping. Amongst his seagoing exploits, he served as master on-board the LNG carrier Hoegh Gandria. I remember him as one of our industry's most well-known and liked characters, always sitting at the front of the audience at our Panel Meetings, nodding agreement with the

speakers' observations and ready with an illuminating and relevant comment. A very approachable and pleasant gentleman, Kjell will be much missed.

The third person to have left us recently was Syd Harris, another great supporter of SIGTTO. Syd was heavily involved with LPG vessel construction over many years and his book, Fully-Refrigerated LPG Carriers, published by Witherbys, is indeed a wonderful reference work and assured pride of place in the SIGTTO library.

Syd also contributed many of the articles which appeared in LNG Shipping at 50, the LNG shipping publication that SIGTTO produced in conjunction with the International Group of LNG Importers (GIIGNL) in 2014 on the occasion of the industry's golden anniversary. I last saw Syd Harris in autumn 2015 at Roger Ffooks funeral. A true gentleman.

I knew all three of these industry stalwarts very well, as did many of you. We should not forget that although we work for different employers we are, like these three gentlemen, all friends, colleagues and part of the same industry.

As the current exciting year winds down, and the new one, with greater volumes of cargo to be shipped than ever before, begins to make its presence felt, SIGTTO looks forward to helping this very responsible industry continue to ensure the safe transportation of liquefied gases by sea.

## BENEFITS OF SIGTTO MEMBERSHIP

SIGTTO members are actively encouraged to promote membership when dealing with any new players in the industry. Please direct them to our website and to the London Liaison Office for further details of how to join.

### In addition to the credibility in the industry that membership brings, SIGTTO members benefit by:

- Access to information that is exclusive to members, such as casualty information and industry statistics
- Regular updates on matters affecting the industry such as legislation, either new or pending, technical or operational developments
- Access to the very comprehensive technical library maintained in the London Office
- Submitting proposals for projects and studies to the General Purposes Committee

- Access to the Technical Advisers in the London Liaison Office who can give advice and obtain advice, on behalf of a member, from within the Society
- Participating in discussion forums with other members each year on topics of particular and mutual interest
- New members receive a copy of all publications, free of charge, produced by SIGTTO
- Free access to the LNGwebinfo portal for updated LNG information as required to conduct compatibility studies. This information is restricted to members of SIGTTO and GIIGNL only

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## HUMAN ELEMENT COMMITTEE

### Cargo control room ergonomics in focus

The third meeting of SIGTTO's new Human Element Committee (HEC 3) was held in London on 30 August 2017 under the chairmanship of John Adams of Teekay. Established one year ago, HEC has 13 members and two observers, and the two initial meetings were focused on establishing the general scope and activities of the new Committee. The definition of the human element, the management of incidents and a review of the design and ergonomics of cargo control rooms were amongst those topics identified as worthy of consideration.

At HEC 3 the working group on cargo control room (CCR) ergonomics identified alarm management as the initial topic on which progress should be made. The decision will involve prioritising cargo alarms as per the *IMO Code on Alerts and Indicators, 2009*. The working group is also planning to review the ship/shore checklist and provide information on the importance of both safety critical systems and the timely activation of emergency shutdown systems (ESDs). After the alarm management task is completed the CCR working group will consider the layout of screens in the cargo control room.



SIGTTO's Human Element Committee has the ergonomics of gas ship cargo control rooms in focus

It was also agreed at HEC 3 that the Committee would take on two new agenda items going forward. They are the discussion of incidents from a human element perspective and consideration of the need for a structured approach to training shore staff. Task forces will be established to assist in progressing both work items.

HEC will maintain a Strategic Framework plan on an ongoing basis going forward. The 'live document' will itemise agenda items in progress and worthy of consideration grouped under the Committee's four strategic objectives, or pillars, i.e. human element/safety critical analysis, measurement tool/incident review, design and ergonomics, and competence.

## EVENTS

### LNG shipping safety in a nutshell



SIGTTO General Manager Andrew Clifton puts the topic of LNG shipping safety into perspective for delegates attending the *LNG Solutions: Fuelling the Future Summit* meeting in Nice, France on 24-25 October 2017. The event brought together representatives from leading LNG-related companies to share their insights on strategies and technologies that will support not only the realisation of new LNG import market opportunities but also growing activities in floating LNG production and regasification, small-scale LNG and LNG bunkering.

## UPCOMING MEETINGS 2017

| MEETINGS                     | DATE   | LOCATION   |
|------------------------------|--------|------------|
| Autumn Board Meeting & AGM   | 15 Nov | Copenhagen |
| Middle East Regional Forum   | 15 Nov | Dubai      |
| Pan American Regional Forum  | 5 Dec  | Houston    |
| SIGTTO/USCG/SGMF Joint Forum | 6 Dec  | Houston    |
| China Regional Forum         | 11 Dec | Shanghai   |
| Australia Regional Forum     | 13 Dec | Perth      |

## UPCOMING MEETINGS 2018

| MEETINGS                        | DATE      | LOCATION  |
|---------------------------------|-----------|-----------|
| 77th General Purposes Committee | 10 Apr    | London    |
| 64th Panel Meeting              | 11-12 Apr | London    |
| 78th General Purposes Committee | 21 Sep    | Barcelona |
| Gastech 2018                    | 17-20 Sep | Barcelona |

## UPCOMING MEETINGS 2019

| MEETINGS                        | DATE    | LOCATION |
|---------------------------------|---------|----------|
| 79th General Purposes Committee | 1 Apr   | Shanghai |
| LNG 2019                        | 1-5 Apr | Shanghai |

## PANEL MEETING: LNG bunkering and US LPG exports in focus at Houston



Babcock Schulte Energy intends the inaugural GSV to be the first of many

Members attending SIGTTO's 63<sup>rd</sup> Panel Meeting in Houston on 4-5 October 2017 had the opportunity to hear 25 speakers make presentations on the latest technical and regulatory developments impacting gas shipping and terminal operations. While several of the speakers dealt with US-specific topics, to bring attendees up to date with the latest developments in the region, most of the presentations were international in scope, with worldwide applicability.

### The following paragraphs examine two of the Houston Panel presentations.

#### New LNG bunker vessel

Babcock Schulte Energy is a new 50/50 partnership between the Babcock International Group and Bernhard Schulte GmbH. The new venture has ordered a 7,500m<sup>3</sup> LNG bunkering tanker at the Hyundai Mipo yard in Korea and is engaged in developing proposed LNG supply ventures, including the Caledonia LNG project in Scotland.

Chris Clucas, corporate expert with Bernhard Schulte Shipmanagement, was on hand in Houston to describe the new bunker tanker to the 63<sup>rd</sup> Panel Meeting delegates. Babcock Schulte Energy terms the ship a gas supply vessel (GSV) as it is designed to not only bunker gas-fuelled vessels but also distribute LNG to onshore industrial consumers.

The GSV's cargo-handling system, termed FGSVO™, is based on a patent-pending design which ensures zero emissions to the atmosphere during normal operations. It embodies a novel integration of existing, proven compressed natural gas (CNG) technology with existing, proven LNG technology.

With the FGSVO system boil-off gas (BOG) and "flash gas" resulting from LNG bunker transfer operations are compressed and stored as CNG and used as fuel as required.

The GSV design uses a "power station" concept, an arrangement that enables immediate delivery of propulsive power during LNG transfer operations. This attribute, in combination with quick release systems for hoses and moorings, provides an unrestricted "sail away" capability in emergency shutdown (ESD) separation scenarios.

Hydraulically powered hose reels can be incorporated amidships and/or at the stern to facilitate a wide range of bunkering scenarios. The availability of the hose reels, in tandem with a crane and flexible pump configurations, will enable many types of gas-powered vessels to be fuelled.

As outlined by Chris Clucas, another distinctive feature of the LNG GSV is the positioning of the accommodation forward. Amongst other things, this configuration gives longitudinal balance to the hull which, in turn, means only a limited amount of permanent fresh water ballast is needed for trim purposes and obviates the need for a ballast water treatment system.

The combination of twin azimuth thrusters aft, bow thrusters and a RangeGuard targetless proximity system provides the GSV with a high degree of manoeuvrability and ensures compliance with the dynamic positioning 2 (DP2) standard. It is anticipated that the union of this manoeuvrability and the excellent visibility offered by the forward bridge will give ports the confidence to waive the need for tug and pilot services.

The inaugural Babcock Schulte Energy GSV is due for delivery in the third quarter of 2018. It will go into service in the Baltic Sea region under charter to Nauticor.

#### US LPG exports

The US climbed past Qatar to become the world's leading exporter of LPG in 2014. Overseas shipments have continued to climb robustly since then as a result of the shale revolution in many parts of the US, most notably Texas and Pennsylvania. US LPG exports reached 25.4 million tonnes in 2016, about 28 per cent of the global trade in the product and more than three times the volume of its nearest rival.

Enterprise Products Partners (EPP) has played a key role in the rapid rise to prominence of the US in the global LPG marketplace. As the company's Greg DeLong told the Panel audience, 50 per cent of US LPG export volumes last year were loaded at EPP's Enterprise Hydrocarbons Terminal



A pair of very large gas carriers load LPG at the Enterprise Hydrocarbons Terminal on the Houston Ship Channel

(EHT) on the Houston Ship Channel in Texas.

EPP has rapidly expanded its Texas gas infrastructure and treatment capabilities in recent years. LPG loading is concentrated at EHT which now has seven ship and two barge docks and is the largest such facility in the world. In 2016 approximately 50 per cent of the exports were directed to Asia, 14 per cent to Europe and Africa, 12 per

cent to South America and 23 per cent to destinations elsewhere in North America.

EPP opened a new Texas gas export terminal in September 2016 which is another world No 1 of its type. The company's Morgan's Point ethane facility, at the mouth of the Houston Ship Channel, is able to load fully refrigerated cargoes at a rate of 6.5 million tonnes per annum.

Greg DeLong pointed out that Houston is the best-appointed of the Texas ports in terms of ship-handling and, despite the surge in gas carrier traffic, still has the capacity to handle more movements of deep-draft vessels. The Channel, which can handle two-way traffic and offers designated barge lanes, accommodated the arrival of 8,300 seagoing ships in 2016.

## FROM THE ARCHIVES ... Kenai Terminal

### Kenai calls it a day

ConocoPhillips is bringing the curtain down on operations at its Kenai plant, the world's oldest surviving LNG liquefaction terminal, this autumn. The facility, located on the shores of southern Alaska's Cook Inlet, loaded its inaugural cargo in October 1969. That historic shipment, to the Negishi receiving terminal in Tokyo Bay, was the first US LNG export and Asian import cargo.

Kenai owes its 48-year presence on the world LNG stage to the discovery by Marathon Oil and Phillips Petroleum of sizeable gas reserves in the Cook Inlet area in the late 1950s and early 1960s. Although there was no local market big enough to warrant major exploitation of the discovery, 3,400km to the southwest Japan was considering the advantages of clean-burning natural gas as a means of dealing with its worsening air pollution.

In March 1967 Tokyo Electric Power and Tokyo Gas signed an agreement with Phillips and Marathon covering the delivery of 1 million tonnes of LNG per annum (mta) to Japan for 15 years, later extended to 1.3 mta for 20 years. In July 1967 the two US companies commissioned the construction of two 71,500m<sup>3</sup> vessels at the Kockums yard in Sweden to transport the contracted volumes.

Costing US\$25 million each, the groundbreaking ships – *Polar Alaska* and *Arctic Tokyo* – were the first LNG carriers with a Gaz Transport invar membrane containment system. Operated by Marathon Oil, the ice-strengthened pair provided valuable service experience that led to design and procedural improvements in future membrane tank LNG carriers aimed at minimising cargo sloshing impacts. Most notable amongst these were alterations to the shape of the cargo tanks and tank filling level restrictions.

In 1993 the Gaz Transport pair were replaced on the 21-day roundtrip route by the new 87,500m<sup>3</sup> pair *Arctic Sun* and *Polar Eagle*. The latter duo were the first, and to date only, LNG carriers with IHI's self-supporting prismatic-shape IMO Type B (SPB) containment system in commercial service. Sturdy SPB tanks are not subject to filling restrictions.

When the US\$200m Kenai plant



Kenai achieved a remarkable four decades of continuous performance

shipped its inaugural consignment in late 1969, it was only the world's second LNG export facility, joining the five-year old CAMEL terminal in Algeria. Over the years Kenai has despatched approximately 1,300 cargoes, primarily to Japan.

By 2009, when the plant's second 20-year export license was due to expire, it was clear that Kenai's days were numbered. Dwindling gas reserves in the region and growing domestic demand for gas meant that volumes available for export were tightening. In any case the march of liquefaction plant technology had ensured that the facility's 1.5 mta of LNG production capacity was marginal in a global context. At full output, the plant was only capable of meeting just over 1 per cent of Japan's LNG needs.

Phillips, by now the amalgamated ConocoPhillips company, and Marathon sought and received permission from the US Department of Energy (DOE) for a two-year extension, to March 2011, of their export license. The OK was conditional on a 50 per cent cut in LNG cargoes, requiring only one ship, and making more gas available to local customers during the cold Alaskan winters.

In 2011 ConocoPhillips bought out Marathon's 30 per cent stake in the Kenai LNG plant and received DOE approval for a

further two-year extension of LNG exports. The clearance enabled the delivery of some much-needed cargoes to Japan in 2011 and 2012, following the devastating March 2011 earthquake and tsunami in that country. However, by late 2012 the call for Kenai LNG had disappeared and ConocoPhillips mothballed the liquefaction facilities.

This was not quite the end for the venerable plant; there was to be a final flurry of LNG shipments as a result of the discovery of some additional gas reserves in the Cook Inlet. The granting of a new two-year extension to the export license, in 2014, enabled the despatch of five spot cargoes that year and six in 2015. The terminal has remained idle since late 2015 and the final shutdown will take place this autumn.

Going forward, there is a possibility that Alaska could rejoin the LNG exporter community. ConocoPhillips is one of three energy majors supporting the State of Alaska in its study of a scheme to pipe the North Slope's rich gas resources 1,300km southwards to a new 20 mta coastal LNG export terminal that would be built not far from the Kenai site. If the mammoth project gets the go-ahead, it would cost an estimated US\$45 billion to bring to fruition and LNG would not begin to flow until at least 2025.



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## Recent gas-related developments at IMO

**IGF Code:** The International Code of Safety for Ships using Gases or other Low-Flashpoint Fuels (IGF Code) entered into force on 1 January 2017. The new Code currently deals with the use of liquefied gases as marine fuel. IMO's Carriage of Cargoes and Containers (CCC) Sub-committee is engaged in work on Phase 2 of the IGF Code, covering the use of fuel cells, methanol and ethanol as means of propulsion.

At the 4<sup>th</sup> Session of the CCC Sub-committee (CCC 4), held on 11-15 September 2017, draft amendments to and Unified Interpretations (UIs) of Part A-1 of the IGF Code were agreed. In addition, CCC 4 made further progress in developing safety provisions for ships using fuel cells in the IGF Code's proposed new Part E on fuel cell power installations. As the work could not be finalised during CCC 4, it will be continued by a correspondence group.

**IGC Code:** The revised International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) entered into force on 1 January 2016 for vessels whose keels are laid on or after 1 July 2016.

At the 96<sup>th</sup> Session of IMO's Maritime Safety Committee (MSC 96) in May 2016 it was agreed that the possible use of high-manganese austenitic steels in cryogenic service merited consideration as a possible amendment to the revised IGC Code. It has been proposed that such steels would be a suitable material for cargo tanks, fuel tanks and piping of LNG carriers and LNG-fuelled ships.

CCC 4 progressed discussions on the proposal. It was agreed that, should the suitability of high-manganese austenitic steel for cryogenic service be established, draft Interim guidelines for its application should be developed rather than amend the IGC Code. CCC's high-manganese steel correspondence group was re-established to progress the work, limiting its scope to steel plates only, to consider pertinent criteria and available information.

The CCC 4 delegates also considered proposed UIs to the IGC Code. These related to the definition of "each drydocking" and the testing of high-level alarms. It was agreed that the expression "each drydocking" is considered to be the survey of the outside of the ship's bottom required for the renewal of the Cargo Ship Safety Construction Certificate and/or the Cargo Ship Safety Certificate. The

The use of high-manganese austenitic steel is under consideration for use on LNG carriers



UI proposing that the sensor operating the automatic shutoff valve, as required by IGC Code 13.3.2, need not be tested with liquid after docking was rejected.

Hydrogen has emerged as a potential liquefied gas carrier cargo in recent years. While such transport is still in the concept phase, interest in developing relevant regulatory requirements has been growing in order to facilitate the launch by the industry of pioneering liquefied hydrogen shipping projects.

While there are currently no specific requirements in the IGC Code governing the design and construction of LH2 carriers, IMO adopted *Interim Recommendations for the Carriage of Liquefied Hydrogen in Bulk* in November 2016 in response to the growing interest in hydrogen transport.

**Dry chemical powder fire-extinguishing systems on gas carriers:** Following a proposal, IMO's Maritime Safety Committee, at its 98<sup>th</sup> Session (MSC 98) on 7-16 June 2017, agreed to consider amendments to the *Guidelines for the approval of fixed dry chemical powder fire-extinguishing systems for the protection of ships carrying liquefied gases in bulk (MSC.1/Circ.1315)*. The proposal highlighted the lack of detailed "fire-extinguishing capability

test" requirements and the fact that the current guidelines specify only the use of powder based on the salts of potassium when other media are available.

MSC 98 approved the new work programme item, although some concerns were expressed about the potential use of sodium bicarbonate-based powders. The technical detail and proposed amendments will be discussed at the upcoming 5<sup>th</sup> Session of IMO's Sub-committee on Ships Systems and Equipment (SSE 5) in March 2018.

### North and Baltic Sea NOx Tier III emission control areas:

At its 71<sup>st</sup> Session on 3-7 July 2017 IMO's Marine Environment Protection Committee (MEPC 71) adopted amendments to Annex VI of the Marine Pollution Convention which establish the North and Baltic Seas as nitrogen oxides (NOx) Tier III emission control areas (ECAs). Under the new provisions ships the keels of which are laid on or after 1 January 2021 must comply with the NOx Tier III emission limits while sailing in the ECAs.

There are some limited exemptions from this new regulation. For example, dual-fuel, Tier II-compliant vessels entering or leaving these ECAs (gas-free) as a new ship, for repair or maintenance, will not have to meet NOx Tier III requirement.

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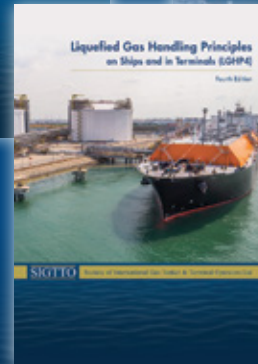
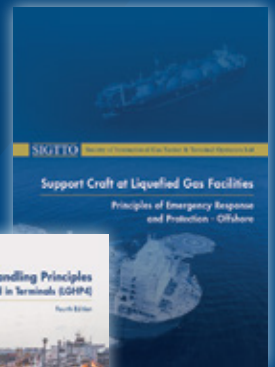
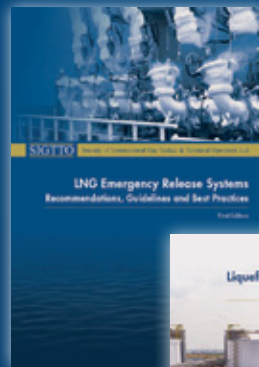


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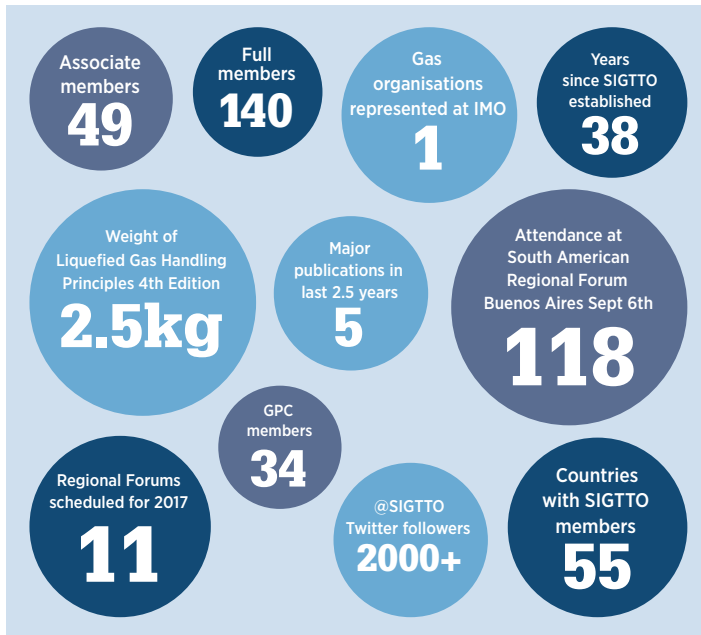


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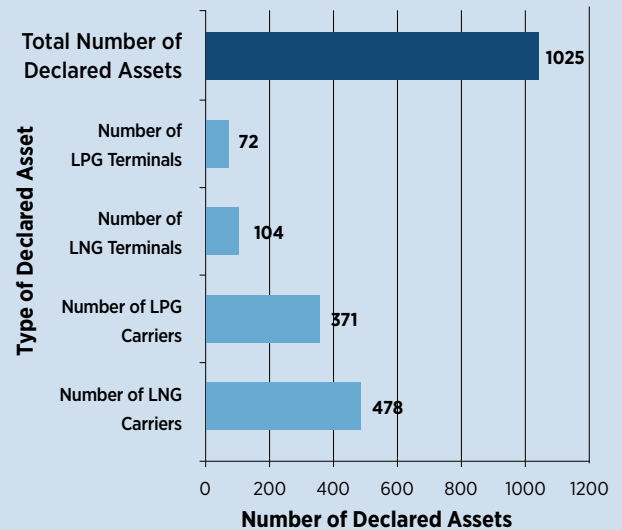
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## SIGTTO IN FIGURES



## SIGTTO Members' Declared Assets



## NEW MEMBERS

### Trio joins the club

Three companies have joined the Society's membership in the six months since the Spring 2017 edition of SIGTTO News. The new members and their date of joining the Society are shown below. The SIGTTO membership now stands at 140 full members, 49 associate members and 27 non-contributory members.

|                              |              |
|------------------------------|--------------|
| Babcock International        | 1 April 2017 |
| Enterprise Products Partners | 1 May 2017   |
| Centrica                     | 1 Jun 2017   |

When **Babcock International** acquired LGE Process from the Weir Group in January 2013, it provided the UK engineering services company with a division specialised in the design, supply and project management of gas processing, handling and storage systems for newbuild gas carriers. LGE Process has been a supporter of SIGTTO's technical activities for many years but, as a pure equipment supplier, was ineligible for membership of the Society. Babcock International is now becoming a SIGTTO member as a joint owner, along with Bernhard Schulte Shipmanagement, of a new 7,500m<sup>3</sup> LNG bunker tanker currently under construction at the Hyundai Mipo yard in Korea and due for delivery in September 2018. The bunker vessel will incorporate a FGSVO gas vapour handling system, a new Babcock LGE Process technology which enables zero-emission ship-to-ship bunkering operations.

A leading North American provider of midstream energy services for the natural gas, natural gas liquids, crude oil, refined

products and petrochemicals sectors, **Enterprise Products Partners LP (EPP)** is well known in the liquefied gas industry as the operator of LPG and ethane export terminals that are the largest not only in the US but the world. The Enterprise Hydrocarbons Terminal (EHT) on the Houston Ship Channel in Texas has been the focus of steady expansion and now has the capacity to export fully refrigerated LPG cargoes at a rate of up to 17.5 million tonnes per annum (mta). Opened in September 2016 at the mouth of the Ship Channel, the company's Morgan's Point ethane export terminal is able to load fully refrigerated cargoes at a rate of 6.5 mta.

**Centrica** is an international energy and services company that continues to develop its presence in the global LNG market as part of a drive to ensure the provision of secure energy supplies for its 28 million customers. Recent activity includes the extension of a gas purchase contract with Qatargas; an LNG procurement alliance with JERA of Japan; the supply of LNG to Jamaica under a three-year deal; and the charter of a GasLog newbuilding LNGC, commencing in late 2019, for use in lifting cargoes that Centrica has secured from the Sabine Pass LNG export plant in the US state of Louisiana under 20-year purchase agreement.

### Centrica's contract extension with Qatargas calls for the purchase of up to 2 mta of LNG for five years starting in January 2019



## GTT Training hosts Houston Panel

The 63<sup>rd</sup> SIGTTO Panel Meeting, held in Houston on 4-5 October 2017, was kindly hosted by GTT Training Ltd. After becoming the first company to join SIGTTO under the Society's new training providers membership category, on 1 August 2015, GTT Training has been an active supporter of a number of SIGTTO initiatives.

GazTransport & Technigaz SA (GTT) established GTT Training as a wholly owned subsidiary in June 2014 to provide high-quality, specialist training and technical services for the LNG industry, with a particular focus on the maritime sector. Available courses include LNG cargo-handling operations, the use of LNG as marine fuel, LNG bunkering and the GTT membrane tank.

The company developed its Liquid Gas Handling Simulator (G-Sim) as a powerful tool central to its LNG cargo-handling operations and LNG bunkering training packages. G-Sim's high-fidelity mathematical models accurately replicate how the various components of a cargo-handling plant function in practice, providing a full range of training options, from basic system familiarisation through to detailed problem-solving and implementing emergency procedures involving LNG cargo and bunkering operations. The LNG carrier modules allow operations on up to 12 different LNG carrier configurations to be simulated.

Amongst the most recent recipients of GTT Training's G-Sim simulators are the US Coast Guard's National Center of Expertise for Gas Carriers in Port Arthur, Texas, the Ho Chi Minh City Vocational Maritime College in Vietnam and the Chevron Shipping Centre of Learning and Development in Glasgow.

Teekay Shipping is another recent purchaser of LNG Shipping's G-Sim LNG simulator software, for installation at its training centres in Glasgow, Manila and Bahrain. GTT Training developed a new propulsion system simulator option as part of this contract, for the low-speed dual-fuel high-pressure gas-injection engines that Teekay has specified for a major series of LNG carrier newbuildings.

GTT Training's director and general manager Ray Gillett reports, "Our aim is to provide the industry with the highly trained personnel required to operate LNG carriers safely and reliably. The high-pressure gas-injection engine option turned out to be a popular addition to the vessel G-Sim configurations then available, considering the number of shipowners



G-Sim is being used for the training of the crew that will man the first LNG bunkering barge in the US

who have since followed Teekay's lead and specified this type of propulsion system for their newbuilding orders."

The challenges facing LNG ship training providers have increased in recent years in tandem with the extension of the LNG supply chain, into the small-scale, bunkering and floating regasification sectors, and the introduction of new propulsion containment and cargo-handling system technologies aimed at improving vessel operational safety and efficiency.

"Smooth integration of the automation networks that monitor and control the various operating systems on a modern LNG carrier is another industry-wide challenge facing design engineers, mariners, training providers and terminal operators alike," states Ray Gillett.

"The rapid spread of the global LNG terminal network exacerbates the situation, as a number of new facilities have had only limited success in recruiting staff with marine experience. GTT Training has been able to assist by running four-day LNGC introductory courses for terminal operators, including several LNG import facilities on the US Gulf Coast that are currently being provided with a bi-directional capability, through new liquefaction plants, and the ability to export cargoes."

Ray Gillett came ashore in 1991 after 17 years at sea and has been involved with gas carrier training, including the development of simulators and intelligent monitoring and feedback systems, ever since. His work at Warsash Maritime and L-3 DPA prior to joining GTT in 2014 has ensured his presence at SIGTTO meetings and in the Society's working groups as the "go-to gas carrier training guru" for over two decades.

That participation has increased as

a result of GTT Training's membership of the Society and when SIGTTO's new Human Element Committee held its inaugural meeting in London in September 2016 (HEC 1), Ray Gillett was present as one of the founder members.

"GTT Training's membership of the Society has provided us with direct contact with a wide range of ship and terminal operators in one forum," comments Ray Gillett. "This dialogue, in turn, has helped us improve our understanding of the needs of those on both the ship and the shore side and to fine-tune our products accordingly."

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