

**SUBMISSION COVER SHEET**

**IMPORTANT:** Check box if Confidential Treatment is requested

Registered Entity Identifier Code (optional): 16-377 (2 of 2)

Organization: New York Mercantile Exchange, Inc. ("NYMEX")

Filing as a:  DCM  SEF  DCO  SDR

Please note - only ONE choice allowed.

Filing Date (mm/dd/yy): 10/06/2016 Filing Description: Initial Listing of Two (2) Fuel Oil Crack Spread Option Contracts

**SPECIFY FILING TYPE**

Please note only ONE choice allowed per Submission.

**Organization Rules and Rule Amendments**

- |                          |                                     |            |
|--------------------------|-------------------------------------|------------|
| <input type="checkbox"/> | Certification                       | § 40.6(a)  |
| <input type="checkbox"/> | Approval                            | § 40.5(a)  |
| <input type="checkbox"/> | Notification                        | § 40.6(d)  |
| <input type="checkbox"/> | Advance Notice of SIDCO Rule Change | § 40.10(a) |
| <input type="checkbox"/> | SIDCO Emergency Rule Change         | § 40.10(h) |

**Rule Numbers:**

**New Product**

Please note only ONE product per Submission.

- |                                     |                                       |            |
|-------------------------------------|---------------------------------------|------------|
| <input checked="" type="checkbox"/> | Certification                         | § 40.2(a)  |
| <input type="checkbox"/>            | Certification Security Futures        | § 41.23(a) |
| <input type="checkbox"/>            | Certification Swap Class              | § 40.2(d)  |
| <input type="checkbox"/>            | Approval                              | § 40.3(a)  |
| <input type="checkbox"/>            | Approval Security Futures             | § 41.23(b) |
| <input type="checkbox"/>            | Novel Derivative Product Notification | § 40.12(a) |
| <input type="checkbox"/>            | Swap Submission                       | § 39.5     |

Official Product Name: See filing.

**Product Terms and Conditions (product related Rules and Rule Amendments)**

- |                          |   |                      |
|--------------------------|---|----------------------|
| <input type="checkbox"/> | Certification   | § 40.6(a)            |
| <input type="checkbox"/> | Certification Made Available to Trade Determination     | § 40.6(a)            |
| <input type="checkbox"/> | Certification Security Futures                          | § 41.24(a)           |
| <input type="checkbox"/> | Delisting (No Open Interest)                            | § 40.6(a)            |
| <input type="checkbox"/> | Approval  | § 40.5(a)            |
| <input type="checkbox"/> | Approval Made Available to Trade Determination          | § 40.5(a)            |
| <input type="checkbox"/> | Approval Security Futures                               | § 41.24(c)           |
| <input type="checkbox"/> | Approval Amendments to enumerated agricultural products | § 40.4(a), § 40.5(a) |
| <input type="checkbox"/> | “Non-Material Agricultural Rule Change”                 | § 40.4(b)(5)         |
| <input type="checkbox"/> | Notification  | § 40.6(d)            |

Official Name(s) of Product(s) Affected:

Rule Numbers:

October 6, 2016

**VIA ELECTRONIC PORTAL**

Mr. Christopher J. Kirkpatrick  
 Office of the Secretariat  
 Commodity Future Trading Commission  
 Three Lafayette Centre  
 1155 21st Street, N.W.  
 Washington, DC 20581

**Re: CFTC Regulation 40.2(a) Certification. Notification Regarding the Initial Listing of Two (2) Fuel Oil Crack Spread Average Price Option Contracts. NYMEX Submission No. 16-377 (2 of 2)**

Dear Mr. Kirkpatrick:

New York Mercantile Exchange, Inc. (“NYMEX” or “Exchange”) is notifying the Commodity Futures Trading Commission (“CFTC” or “Commission”) that it is self-certifying the initial listing of two (2) new fuel oil crack spread option contracts: 1) 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option, and 2) Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option (the “Contracts”) for trading on CME Globex and the NYMEX trading floor, and for submission for clearing via CME ClearPort, effective on Sunday, October 23, 2016 for trade date Monday, October 24, 2016.

The Contracts’ specifications are as follows:

<b>Contract Title</b>	3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option	Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option
<b>Commodity Code</b>	BCO	SCO
<b>Rulebook Chapter</b>	253	252
<b>Trading and Clearing Venues</b>	CME Globex, CME ClearPort and Open Outcry	CME Globex, CME ClearPort and Open Outcry
<b>Settlement Method</b>	Financial	Financial
<b>Contract Size</b>	6,350 barrels	6,350 barrels
<b>Listing Schedule</b>	Monthly contracts listed for the current year and the next 4 calendar years	Monthly contracts listed for 48 consecutive months
<b>First Listed Month</b>	November 2016	November 2016
<b>Exercise Style</b>	European	European

<b>Minimum Price Fluctuation</b>	\$0.001 per barrel	\$0.001 per barrel
<b>Value per Tick</b>	\$6.35	\$6.35
<b>Block Trade Minimum Threshold</b>	5 contracts	5 contracts
<b>Strike Increment</b>	\$0.25 per barrel	\$0.25 per barrel
<b>Termination of Trading</b>	Trading terminates on the last business day of the contract month.	Trading terminates on the last business day of the contract month.
<b>CME Globex Matching Algorithm</b>	First in First Out (FIFO)	First in First Out (FIFO)

Trading and Clearing Hours:

<b>CME Globex and CME ClearPort</b>	Sunday – Friday 6:00 p.m. – 5:00 p.m. (5:00 p.m. – 4:00 p.m. Chicago Time/CT) with a 60-minute break each day beginning at 5:00 p.m. (4:00 p.m. CT)
<b>Open Outcry</b>	Monday – Friday 9:00 a.m. – 2:30 p.m. (8:00 p.m. – 1:30 p.m. (Chicago Time/CT)

Fees:

<b>Exchange Fees</b>	<b>Member</b>	<b>Cross-Division</b>	<b>Non-Member</b>	<b>International Incentive Programs (IIP/IVIP)</b>
CME Globex	7.00	8.00	9.00	8.00
Open Outcry	7.00	8.00	9.00	
Block	7.00		9.00	
EFR/EOO	7.00		9.00	
<b>Processing Surcharges</b>	<b>Member</b>	<b>Non-Member</b>		
Cash Settlement	1.00	1.00		
<b>Other Fees</b>				
Facilitation Fee		0.40		
Give-up Surcharge		0.05		
Position Transfer/Position Adjustment		0.10		

The Exchange is also notifying the CFTC that it is self-certifying the insertion of the terms and conditions for the new option contracts into the Position Limit, Position Accountability and Reportable Level Table and Header Notes located in the Interpretations and Special Notices Section of Chapter 5 of the NYMEX Rulebook in relation to the listing of the Contracts. These terms and conditions establish the all month/any one-month accountability levels, expiration month position limit, reportable level, and aggregation allocation for the new contract. Please see Appendix B, attached under separate cover.

NYMEX is self-certifying block trading on the Contracts with a minimum block threshold of five (5) contracts. This minimum block threshold level aligns with the underlying futures contracts, 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Futures and Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Futures.

The Exchange reviewed the designated contract market core principles (“Core Principles”) as set forth in the Commodity Exchange Act (“CEA”) and staff identified that the Contract may have some bearing on the following Core Principles:

Compliance with Rules: Trading in the Contracts will be subject to all NYMEX Rules, including prohibitions against fraudulent, noncompetitive, unfair and abusive practices as outlined in Rule Chapter 4, the Exchange’s trade practice rules, the majority of which are contained in Chapter 5 and Chapter 8 of the Rulebook, and the dispute resolution and arbitration procedures of NYMEX Rule Chapter 6. As with all products listed for trading on one of CME Group’s designated contract markets, trading activity in the Contract will be subject to monitoring and surveillance by the Exchange’s Market Regulation Department. The Market Regulation Department has the authority to exercise its investigatory and enforcement power where potential rule violations are identified.

Contracts Not Readily Subject to Manipulation: The Contracts are not susceptible to manipulation because of their structural attributes, active underlying markets and reliance on well administered indexes. Final settlements are based on indexes published by S&P Global Platts (“Platts”) and sub-licensed to the Exchange.

Prevention of Market Disruption: Trading in the Contracts will be subject to the Rules of NYMEX, which include prohibitions on manipulation, price distortion, and disruption to the cash settlement process. As with any new product listed for trading on a CME Group designated contract market, trading activity in the futures contract proposed herein will be subject to monitoring and surveillance by CME Group’s Market Regulation Department.

Position Limitations or Accountability: The speculative position limits for the Contracts as demonstrated in this submission are consistent with the Commission’s guidance.

Availability of General Information: The Exchange will publish on its website information in regard to contract specifications, terms, and conditions, as well as daily trading volume, open interest, and price information for the Contracts.

Daily Publication of Trading Information: The Exchange will publish contract trading volumes, open interest levels, and price information daily on its website and through quote vendors for the Contracts.

Execution of Transactions: The Contracts will be listed for trading on the CME Globex electronic trading platform and Open Outcry, and for clearing through the CME ClearPort platform. The CME Globex trading venue provides for competitive and open execution of transactions. CME Globex affords the benefits of reliability and global connectivity. The CME ClearPort platform provides a competitive, open and efficient mechanism for novating transactions that are competitively executed by brokers.

Trade Information: All requisite trade information for the Contracts will be included in the audit trail and is sufficient for the Market Regulation Department to monitor for market abuse.

Financial Integrity of Contracts: The Contracts will be cleared by the CME Clearing House, a derivatives clearing organization registered with the Commodity Futures Trading Commission and subject to all CFTC regulations related thereto.

Protection of Market Participants: NYMEX Rulebook Chapters 4 and 5 set forth multiple prohibitions that preclude intermediaries from disadvantaging their customers. These rules apply to trading in all of the Exchange's competitive trading venues.

Disciplinary Procedures: Chapter 4 of the Rulebook contains provisions that allow the Exchange to discipline, suspend or expel members or market participants that violate the Rulebook. Trading in the contract will be subject to Chapter 4, and the Market Regulation Department has the authority to exercise its enforcement power in the event rule violations in the product are identified.

Dispute Resolution: Disputes with respect to trading in the Contracts will be subject to the arbitration provisions set forth in Chapter 6 of the Rulebook. Chapter 6 allows all nonmembers to submit a claim for financial losses resulting from transactions on the Exchange to arbitration. A member named as a respondent in a claim submitted by a nonmember is required to participate in the arbitration pursuant to Chapter 6. Additionally, the Exchange requires that members resolve all disputes concerning transactions on the Exchange via arbitration.

Pursuant to Section 5c(c) of the Act and CFTC Regulation 40.2(a), the Exchange hereby certifies that listing the Contracts complies with the Act, including regulations under the Act. There were no substantive opposing views to the listing of the Contracts.

The Exchange certifies that this submission has been concurrently posted on the Exchange's website at <http://www.cmegroup.com/market-regulation/rule-filings.html>.

Should you have any questions concerning the above, please contact the undersigned at (212) 299-2200 or via e-mail at [CMEGSubmissionInquiry@cmegroup.com](mailto:CMEGSubmissionInquiry@cmegroup.com).

Sincerely,

/s/Christopher Bowen  
Managing Director and Chief Regulatory Counsel

Attachments: Appendix A: NYMEX Rulebook Chapters  
Appendix B: Position Limit, Position Accountability, and Reportable Level Table in Chapter 5 of the NYMEX Rulebook (attached under separate cover)  
Appendix C: NYMEX Rule 588.H. – (“Globex Non-Reviewable Trading Ranges”) Table  
Appendix D: Cash Market Overview and Analysis of Deliverable Supply

## **APPENDIX A**

### **NYMEX Rulebook**

#### **Chapter 253**

#### **3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option**

##### **253100. SCOPE OF CHAPTER**

The provisions of these rules shall apply to all contracts bought or sold on the Exchange for cash settlement based on the Floating Price. The procedures for trading, clearing and cash settlement of this contract, and any other matters not specifically covered herein shall be governed by the general rules of the Exchange.

##### **253101. OPTION CHARACTERISTICS**

The number of months open for trading at a given time shall be determined by the Exchange.

###### **253101.A. Trading Schedule**

The hours of trading for this contract shall be determined by the Exchange.

###### **253101.B. Trading Unit**

A 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Call Option traded on the Exchange represents the differential between the final settlement price of the Floating Price and the strike price, multiplied by 6,350 barrels, or zero, whichever is greater. A 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Put Option traded on the Exchange represents the differential between the strike price and the Floating Price, multiplied by 6,350 barrels, or zero, whichever is greater.

The Floating Price is equal to the arithmetic average of the mid-point of the high and low quotations from the Platts European Marketscan for 3.5% Fuel Oil under the heading "Barges FOB Rotterdam" minus the ICE Brent Crude Oil Futures first nearby contract settlement price for each business day during the contract month (using Non-common pricing).

The settlement price of the first nearby Brent Crude Oil Futures contract month will be used except on the last day of trading for the expiring Brent Crude Oil Futures contract when the settlement price of the second nearby contract month will be used.

For purposes of determining the Floating Price, the Platts Fuel Oil assessment price will be converted each day to U.S. dollars and cents per barrel, rounded to the nearest cent. The conversion factor will be 6.35 barrels per metric ton.

The Floating Price is calculated using the non-common pricing convention. In calculating the spread differential, the monthly average for each component leg of the spread shall be calculated by using all trading days in the month for each component leg of the spread, followed by the calculation of the spread differential between the two averages

###### **253101.C. Price Increments**

Prices shall be quoted in U.S. dollars and cents per barrel. The minimum price fluctuation shall be \$0.001 per barrel.

###### **253101.D. Position Limits, Exemptions, Position Accountability and Reportable Levels**

The applicable position limits and/or accountability levels, in addition to the reportable levels, are set forth in the Position Limit, Position Accountability and Reportable Level Table in the Interpretations & Special Notices Section of Chapter 5.

A Person seeking an exemption from position limits for bona fide commercial purposes shall apply to the Market Regulation Department on forms provided by the Exchange, and the Market Regulation Department may grant qualified exemptions in its sole discretion.

Refer to Rule 559 for requirements concerning the aggregation of positions and allowable exemptions from the specified position limits.

#### **253101.E. Termination of Trading**

Trading terminates on the last business day of the contract month.

#### **253101.F. Type of Option**

The option is a European-style option cash settled on expiration day.

### **253102.**

#### **EXERCISE PRICES**

(A) Trading in an option contract month shall be at the previous day's settlement price for 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) futures contracts in the corresponding delivery month rounded off to the nearest twenty-five cent increment exercise price unless such settlement price is precisely midway between two twenty-five cent increment exercise prices in which case it shall be rounded off to the lower twenty-five cent increment strike price.

(B) Upon demand and at the discretion of the Exchange, a new option contract with new exercise price may be added, on an as-soon-as-possible basis, provided that the new exercise price of such newly added option contract is in twenty-five cent increment to the exercise price described in subsection (A).

(C) The Exchange may modify the provisions governing the establishment of exercise prices as it deems appropriate.

### **253103.**

#### **DISCLAIMER**

NEITHER THE NEW YORK MERCANTILE EXCHANGE, INC. NOR S&P GLOBAL PLATTS, A DIVISION OF THE S&P GLOBAL, INC. ("PLATTS") GUARANTEES THE ACCURACY AND/OR COMPLETENESS OF THE INDEX NOR ANY OF THE DATA INCLUDED THEREIN.

NYMEX AND PLATTS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AS TO THE RESULTS TO BE OBTAINED BY ANY PERSON OR ENTITY FROM USE OF THE INDEX, TRADING BASED ON THE INDEX, OR ANY DATA INCLUDED THEREIN IN CONNECTION WITH THE TRADING OF THE CONTRACTS, OR, FOR ANY OTHER USE. NYMEX AND PLATTS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AND HEREBY DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE WITH RESPECT TO THE INDEX OR ANY DATA INCLUDED THEREIN. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT SHALL NYMEX OR PLATTS HAVE ANY LIABILITY FOR ANY LOST PROFITS OR INDIRECT, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT SHALL NYMEX, ITS AFFILIATES OR PLATTS HAVE ANY LIABILITY FOR ANY LOST PROFITS OR INDIRECT, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.

## Chapter 252

### Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option

#### 252100. SCOPE OF CHAPTER

The provisions of these rules shall apply to all contracts bought or sold on the Exchange for cash settlement based on the Floating Price. The procedures for trading, clearing and cash settlement of this contract, and any other matters not specifically covered herein shall be governed by the general rules of the Exchange.

#### 252101. OPTION CHARACTERISTICS

The number of months open for trading at a given time shall be determined by the Exchange.

##### 252101.A. Trading Schedule

The hours of trading for this contract shall be determined by the Exchange.

##### 252101.B. Trading Unit

A Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Call Option traded on the Exchange represents the differential between the final settlement price of the Floating Price and the strike price, multiplied by 6,350 barrels, or zero, whichever is greater. A Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Put Option traded on the Exchange represents the differential between the strike price and the Floating Price, multiplied by 6,350 barrels, or zero, whichever is greater.

The Floating Price is equal to the arithmetic average of the mid-point of the high and low quotations from the Platts Asia-Pacific Marketscan for HSFO 380cst (High-Sulfur Fuel Oil) under the heading "Singapore Physical Cargoes" minus the ICE Brent Crude Oil Futures first nearby contract settlement price for each business day during the contract month.

The settlement price of the first nearby Brent Crude Oil Futures contract month will be used except on the last day of trading for the expiring Brent Crude Oil Futures contract when the settlement price of the second nearby contract month will be used.

For purposes of determining the Floating Price, the Platts Fuel Oil assessment price will be converted each day to U.S. dollars and cents per barrel, rounded to the nearest cent. The conversion factor will be 6.35 barrels per metric ton.

The Floating Price is calculated using the non-common pricing convention. In calculating the spread differential, the monthly average for each component leg of the spread shall be calculated by using all trading days in the month for each component leg of the spread, followed by the calculation of the spread differential between the two averages.

##### 252101.C. Price Increments

Prices shall be quoted in U.S. dollars and cents per barrel. The minimum price fluctuation shall be \$0.001 per barrel.

##### 252101.D. Position Limits, Exemptions, Position Accountability and Reportable Levels

The applicable position limits and/or accountability levels, in addition to the reportable levels, are set forth in the Position Limit, Position Accountability and Reportable Level Table in the Interpretations & Special Notices Section of Chapter 5.

A Person seeking an exemption from position limits for bona fide commercial purposes shall apply to the Market Regulation Department on forms provided by the Exchange, and the Market Regulation Department may grant qualified exemptions in its sole discretion.

Refer to Rule 559 for requirements concerning the aggregation of positions and allowable exemptions from the specified position limits.

##### 252101.E. Termination of Trading

Trading terminates on the last business day of the contract month.

##### 252101.F. Type of Option



The option is a European-style option cash settled on expiration day.

**252102. EXERCISE PRICES**

(A) Trading in an option contract month shall be at the previous day's settlement price for Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) futures contracts in the corresponding delivery month rounded off to the nearest twenty-five cent increment exercise price unless such settlement price is precisely midway between two twenty-five cent increment exercise prices in which case it shall be rounded off to the lower twenty-five cent increment strike price.

(B) Upon demand and at the discretion of the Exchange, a new option contract with new exercise price may be added, on an as-soon-as-possible basis, provided that the new exercise price of such newly added option contract is in twenty-five cent increment to the exercise price described in subsection (A).

(C) The Exchange may modify the provisions governing the establishment of exercise prices as it deems appropriate.

**252103. DISCLAIMER**

NEITHER THE NEW YORK MERCANTILE EXCHANGE, INC. NOR S&P GLOBAL PLATTS, A DIVISION OF THE S&P GLOBAL, INC. ("PLATTS") GUARANTEES THE ACCURACY AND/OR COMPLETENESS OF THE INDEX NOR ANY OF THE DATA INCLUDED THEREIN.

NYMEX AND PLATTS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AS TO THE RESULTS TO BE OBTAINED BY ANY PERSON OR ENTITY FROM USE OF THE INDEX, TRADING BASED ON THE INDEX, OR ANY DATA INCLUDED THEREIN IN CONNECTION WITH THE TRADING OF THE CONTRACTS, OR, FOR ANY OTHER USE. NYMEX AND PLATTS MAKE NO WARRANTIES, EXPRESS OR IMPLIED, AND HEREBY DISCLAIMS ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE WITH RESPECT TO THE INDEX OR ANY DATA INCLUDED THEREIN. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT SHALL NYMEX OR PLATTS HAVE ANY LIABILITY FOR ANY LOST PROFITS OR INDIRECT, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT SHALL NYMEX, ITS AFFILIATES OR PLATTS HAVE ANY LIABILITY FOR ANY LOST PROFITS OR INDIRECT, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOST PROFITS), EVEN IF NOTIFIED OF THE POSSIBILITY OF SUCH DAMAGES.

**APPENDIX B**

**Position Limit, Position Accountability, and Reportable Level Table in Chapter 5  
of the NYMEX Rulebook**

(Attached under separate cover.)

## APPENDIX C

### NYMEX Rule 588.H. – (“Globex Non-Reviewable Trading Ranges”) Table

(Additions are underscored.)

Instrument Name	Globex Symbol	Non-Reviewable Range (NRR)	Bid/Ask Reasonability
<u>3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option</u>	<u>BCO</u>	<u>The greater of delta times the underlying futures non-reviewable range or 20% of premium up to 1/4 of the underlying futures' non-reviewable range with a minimum of 1 tick.</u>	<u>The greater of delta times the underlying futures non-reviewable range or 20% of the fair value premium up to the underlying futures' non-reviewable range with a minimum reasonability of 50 ticks.</u>
<u>Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option</u>	<u>SCO</u>	<u>The greater of delta times the underlying futures non-reviewable range or 20% of premium up to 1/4 of the underlying futures' non-reviewable range with a minimum of 1 tick.</u>	<u>The greater of delta times the underlying futures non-reviewable range or 20% of the fair value premium up to the underlying futures' non-reviewable range with a minimum reasonability of 50 ticks.</u>

## **APPENDIX D**

### **Cash Market Overview and Analysis of Deliverable Supply**

#### **Introduction**

Exchange staff conducted a review of the underlying cash markets and deliverable supply of high sulfur fuel oil in Northwest Europe and Singapore to determine the position limits for the 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option and Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option.

The Exchange reviewed the underlying cash market of high sulfur fuel oil in Northwest Europe and Singapore, and the deliverable supply of high sulfur fuel oil in each of those markets. The Exchange determined to base its analysis of deliverable supply on production and imports of high sulfur fuel oil in each of the respective markets. In its analysis of deliverable supply, the Exchange did not include stocks data as the data tends to fluctuate. Additionally, the Exchange determined not to adjust the deliverable supply estimates based on the spot availability because spot market liquidity is not restrictive and tends to vary depending on the market fundamentals of supply and demand. The typical term agreement in the cash market allows flexibility for re-trading of the contracted quantity in the spot market, so the term agreements do not restrict the potential deliverable supply.

#### **Data Source**

The Exchange based its analysis of deliverable supply of high sulfur fuel oil in Northwest Europe and Singapore on data provided by the Bloomberg, Joint Oil Data Initiative, the Singapore Energy Market Authority and Eurostat.

The Joint Oil Data Initiative (JODI), which was launched in April 2001 by six international organizations (Asia Pacific Economic Cooperation (APEC), Statistical Office of the European Communities (Eurostat), International Energy Agency (IEA), Latin American Energy Organization (OLADE), Organization of the Petroleum Exporting Countries (OPEC), United Nations Statistics Division (UNSD)), provides a reliable, freely accessible and comprehensive database of energy statistics. JODI's data is dependent upon what each country reports and in what timeframe. Participating countries complete a standard data table in JODI-Oil Questionnaire and/or JODI-Gas Questionnaire every month for the two most recent months (M-1 and M-2) and submit it to the JODI partner organization(s) of which it is a member. The respective organization compiles the data and forwards it to the IEF which is responsible for the JODI World Databases. For most developed economies, the quality of the data being reported is high and gets submitted in a timely manner. JODI uses three measures to grade the data that it receives, according to their website<sup>1</sup>. The three categories are timeliness, completeness and sustainability and the three measures JODI uses are "good," "fair," or "poor" depending on what data is received. JODI assigns a "non-assessable" (n/a) grade when a country or economy did not submit the JODI oil questionnaire during the assessment period or during the six months prior to the assessment period. The four countries located in the Northwest Europe region under review in this analysis are Belgium, France, Germany and the Netherlands, and have received a "good" measure in all three categories in the most recent oil questionnaire—the best rating they could have received.

The Singapore Energy Market Authority (EMA)<sup>2</sup> data is compiled by the Singapore Government and covers statistics on Production, Consumption, Stocks, Imports and Exports within the Energy sector in

---

<sup>1</sup> <https://www.jodidata.org/oil/support/user-guide/assessments.aspx>

<sup>2</sup> <http://www.ema.gov.sg/index.aspx>

Singapore. This data is constantly being updated and is a reliable source for those looking to get the most complete and accurate data from this vibrant energy trading hub. We have referred to the EMA data in the second part of our analysis highlighting the Singapore Fuel Oil Market as it is the best and most reliable data source for this country's activity.

The Eurostat<sup>3</sup> data is compiled by the statistical office of the European Union and aims to provide the EU with accurate statistics that enable comparisons between countries and regions. The statistical authorities in each individual member state are responsible for collecting the data. After verification and analysis, the individual authorities send the data to Eurostat who consolidate such data. In addition, Eurostat ensures that all parties are employing the same methodology in collecting and reporting data. The Exchange determined to use Eurostat data for sulfur content of fuel oil in Northwest Europe because of the highly specialized statistical categories collected by Eurostat.

The final settlement prices for each of European 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option and Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option are based on the price differential between assessment of the respective underlying physical markets as assessed and published by Platts, a division of S&P Global ("Platts"), and Brent crude oil futures. Platts is a leading global provider of energy, petrochemicals, metals and agriculture information, and a premier source of benchmark price assessments for those commodity markets. Since 1909, Platts has provided information and insights that help customers make sound trading and business decisions and enable the markets to perform with greater transparency and efficiency. Platts' assessment methodologies for the 3.5% fuel oil barges Northwest Europe<sup>4</sup> and 380cst Singapore fuel oil<sup>5</sup> markets are available on Platts' website.

CME Group (parent company of New York Mercantile Exchange, Inc.) is a party to license agreements with Platts to utilize their pricing data.

## **Cash Market Overview**

### **Brent Crude Oil (BFOE)**

The North Sea market is comprised of the oil fields in the UK and Norwegian North oil sectors. There is a series of smaller oil fields which connect into larger streams. The most important streams in the North Sea are Brent, Forties, Oseberg and Ekofisk and each stream has a principle operator that is responsible for the day to the day control of the operations including the scheduling of the cargoes based on the production from each of the smaller producing fields. The Brent, Forties, Oseberg and Ekofisk fields are known as BFOE and they underpin the Brent complex and are the key grades of oil that make up the trading of Dated Brent – the international crude oil physical benchmark price. The four BFOE fields lie in the North Sea. Brent and Forties are in the UK sector, whilst Ekofisk and Oseberg are in the Norwegian sector.

The core of the Brent market is the cash market. The Brent forward market consists of the trading of cargoes of any of the Brent, Forties, Oseberg and Ekofisk streams for delivery beyond month ahead, with no specific dates assigned for loading. The cargoes are 600,000 barrels and, in the forward market, the precise loading dates are not provided, only the delivery month i.e. December BFOE Cargo. However the

---

<sup>3</sup> <http://ec.europa.eu/eurostat>

<sup>4</sup> <http://www.platts.com/IM.Platts.Content/MethodologyReferences/MethodologySpecs/Europe-africa-refined-products-methodology.pdf>

<sup>5</sup> <http://www.platts.com/IM.Platts.Content/MethodologyReferences/MethodologySpecs/Asia-refined-oil-products-methodology.pdf>

commercial contracts, which are standardized, underlying the forward market to specify the minimum timing the seller must provide the buyer to notify them as to the specific cargo loading date – currently 10 days to month ahead. After the seller of a BFOE forward cargo notifies the buyer as to the loading date and which stream is being loaded, the contract is now considered to have moved from the forward market to the Dated Brent market, historically this moment is referred to as the cargo going “wet” i.e. it has loading dates attached to it and can therefore be sold as a Dated Brent cargo.

The Brent cash market is essentially a reseller market where buyers either: resell the oil to someone else; transport the cargo and resell it later; or transport the cargo to consume it. Most of the sales in the Brent market are conducted as spot-market transactions; in fact, Brent cargoes in the physical market are estimated to trade 10 or more times. Typically, there is a chronology of sales and purchases of crude oil in the Brent cash market that starts with a sale from the equity producer in a spot market transaction, and finishes with a purchase by an end-user to consume the crude oil. Equity producers typically utilize the robust spot market to sell their BFOE production at the cargo loading terminal, as a “Free on Board” (FOB) delivery. Traders play an active role in the Brent market as middlemen with the expressed responsibility of reselling the oil. Further, the refiners typically rely on the spot market to purchase Brent crude oil, because there is vibrant liquidity in the spot market, and hence, the refiners have developed a preference for short-term spot market purchases, rather than long-term contracts. This applies to refiners affiliated with equity producers as well as those not affiliated; this is the standard practice, established and institutionalized over the past 34 years.

Production of BFOE has been declining over the past few years due to the cost of drilling and the returns on investment compared to other regions in the world. These four North Sea grades are segregated blends delivered at different locations in the North Sea, and each can be substituted by the seller in the 25-Day BFOE cash market (“the forward market”). Quality adjustments ensure that all four grades can be delivered to a buyer under the standardized forward contract. Platts made an adjustment to the forward market mechanism with effect from the March 2015 contract month with the nomination period being extended from 10 to 25 days to 10 days to month ahead. Both ICE and NYMEX adjusted the expiry calendar (that started with effect from the March 2016 contract month) of the Futures to align more closely with the forward market. An earlier transition (for the futures) would have had a significant impact on the open interest holders hence the change was delayed due to this impact.

The process of moving from a forward to the physical market where a forward Brent cargo becomes a physical North Sea Dated Brent cargo happens as follows:

1. Refiners, producers and traders enter into a forward agreement for a particular month.
2. The Operator of each field being Shell for Brent; BP for Forties; ConocoPhillips for Oseberg and Statoil for Ekofisk will announce the loading programs for each contract month a few days prior to the beginning of the month (one month prior) to each loading month (i.e. cargoes in the delivery month start to load). For example, for a June 2016 contract month, the field operators will announce the loading schedules a few days prior to the beginning of April 2016. The equity producers will begin the chain of nominating cargoes to buyers (or they can decide to keep the cargo). A buyer benefiting from a nomination can keep the cargo or pass it to another player with whom it has another forward contract. Buyers trade the cash BFOE on the basis that they will accept any cargo as nominated provided that it is done so within the agreed notice period (10 days to month ahead) by 4:00 p.m. London time. Any cargo not nominated by this time will remain with the participant last notified. After 4:00 p.m. London time, the cargo becomes wet physical with precise loading dates attached.

- Cargoes that are wet physical will be sold as a Dated Brent cargo with cargo loading dates between 10 days and month ahead (forward).

Chart 1 below shows the makeup of the fields in the Forties pipeline system (FPS) which is operated by BP. There are over 50 offshore fields that flow through within the FPS. The delivery point for Forties crude oil is Hound Point, which is on the East coast of Scotland a short distance from the UK oil capital Aberdeen. Forties is a blended crude oil from all of the fields that feed into it.

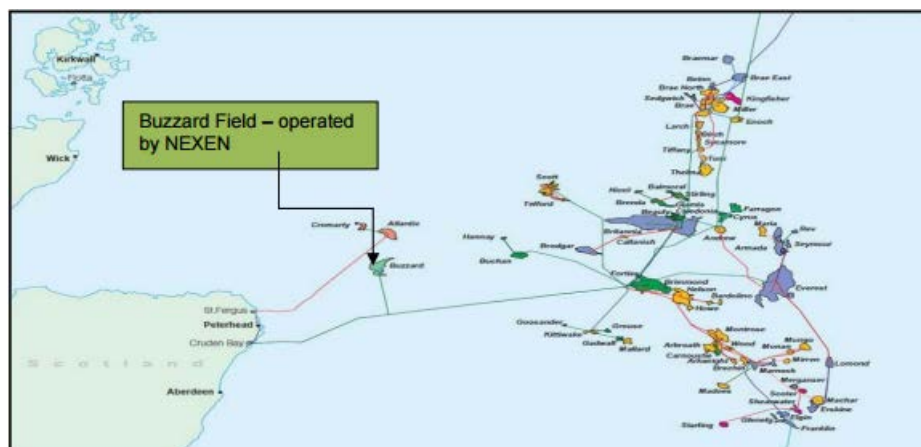


Chart 1: Example of the Forties Pipeline System

The blend changed at the beginning of 2007 when crude oil from the Buzzard field began to flow into it. Crucially Buzzard is now the largest field within the FPS. Buzzard crude oil is a medium gravity, sour crude oil with an API of 32.6 and a sulfur content of 1.44% therefore the yield is very similar to that of Urals crude oil (from Russia). The FPS produces a forward forecast of the anticipated percentage of Buzzard crude in Forties Blend. The overall quality of Forties crude oil varies depending on the percentage of Buzzard as a proportion of the overall blend.

Table 1: Percentage of Crude from Buzzard Field Estimates<sup>6</sup> (updated July 2016)

Month	Buzzard % in Forties Blend	Forties Blend production (kbd)
August 2016	39.6%	407.7
September 2016	23.1%	414.6
October 2016	13.6%	407.5
November 2016	32.3%	550.3

The start-up of the Buzzard field feeding into the Forties pipeline system (refer to chart 1) has resulted in Forties being almost always the cheapest of the four grades to deliver as a dated Brent cargo due to the higher sulfur content of Buzzard compared to Forties and the fact that Buzzard comprises of between 35% and 40% of the total volume of the Forties blend. Note that for September and October 2016, the percent of Buzzard crude oil in the Forties stream has dropped, due to planned field maintenance to the Buzzard crude oil stream. The loaded volumes for Forties crude oil (including Buzzard) are also lower during this period as a result.

Bloomberg LP (“Bloomberg”) provides details of the BFOE loading programs for the four grades that comprise the Brent market. Based on the most recent 3-year average of the Bloomberg data on BFOE

<sup>6</sup> Forties Pipeline System – Forties Blend Assay  
[http://www.bp.com/en/global/forties-pipeline/about\\_fps/forties\\_blend\\_quality.html](http://www.bp.com/en/global/forties-pipeline/about_fps/forties_blend_quality.html)

Loadings (from August 2013 to July 2016), the total loadings of Brent (BFOE) crude oil was approximately 883,878 barrels per day, which is equivalent to approximately 26.5 million barrels per month (see table 2).

The Bloomberg data shows the volume of crude oil for Brent, Forties, Oseberg and Ekofisk (collectively known as BFOE). Whilst the volumes appear to have stabilized through the end of 2015, there are questions about the future output of these grades in the future due to the low oil price and high cost environment for operators in the North Sea.

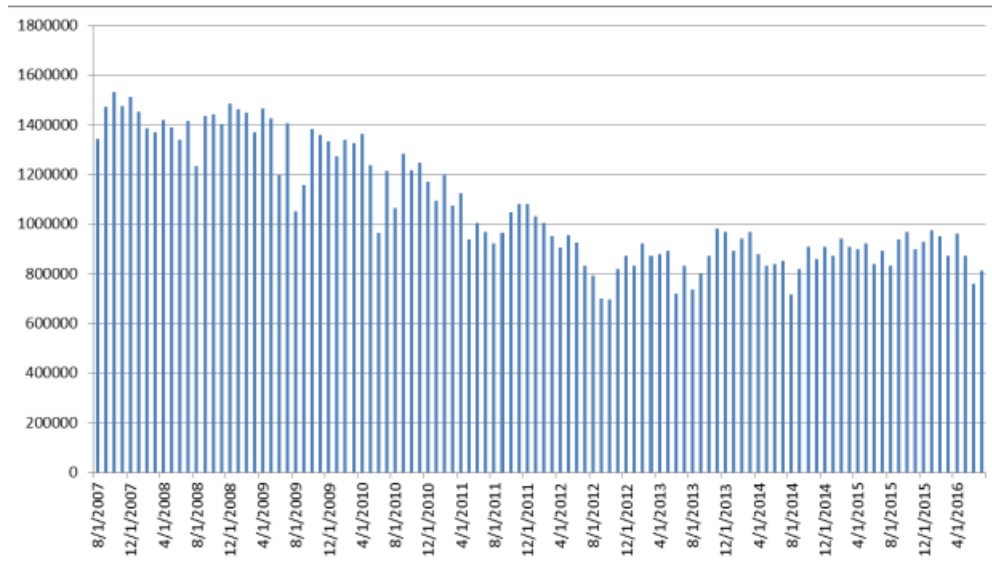


Chart 2: Monthly Loadings of Brent, Forties, Oseberg, Ekofisk

Table 2. BFOE Loading Volume

Units: barrels per day

Source: Bloomberg

	<b>BFOE Loading</b>
Aug-13	735484
Sep-13	800000
Oct-13	870968
Nov-13	980000
Dec-13	967742
Jan-14	890323
Feb-14	942857
Mar-14	967742
Apr-14	880000
May-14	832258
Jun-14	840000
Jul-14	851613
Aug-14	716129
Sep-14	820000
Oct-14	909677
Nov-14	860000
Dec-14	909677



Jan-15	870968
Feb-15	942857
Mar-15	909677
Apr-15	900000
May-15	922581
Jun-15	840000
Jul-15	890323
Aug-15	832258
Sep-15	940000
Oct-15	967742
Nov-15	900000
Dec-15	929032
Jan-16	974194
Feb-16	950690
Mar-16	870968
Apr-16	960000
May-16	870968
Jun-16	760000
Jul-16	812903
<b>3 Yr Average</b>	<b>883,879</b>

The Brent market is priced in USD and cents per barrel. There are two significant futures contracts based on trading activity in the forward BFOE market; NYMEX and ICE Futures Europe offer trading of Brent Futures on their respective Exchanges. The cash market is traded in partials of 100,000 barrels or larger full size cargo transactions of 600,000 barrels. Physical convergence can occur through the partials market mechanism upon the trading of six parcels with the same counterparty in a single delivery month. If physical convergence does not occur, then trades are booked out at the prevailing cash value on the last day of trading day of the cash market for the specific delivery month (i.e. this is currently on a month ahead basis prior to the 1st loading date of the delivery month). Full sized physical cargo BFOE trades will be used by ICE in the establishment of the Brent Index which is the mechanism by which the futures open on expiry are cash settled<sup>7</sup>.

### **Northwest Europe (NWE) Fuel Oil Market**

The main hub for the Northwest European fuel oil market is Amsterdam-Rotterdam-Antwerp (ARA) where there is extensive storage and refining capacity. The ARA market is a major supply center to the inland European market and acts as a significant import and export center for the large vessels which are often traded in the region. A significant amount of imports are from the Baltic States and Russia—cargoes from these areas are shipped to the Rotterdam region for further blending into specific fuel grades that are required by the European market.

The two main grades of fuel oil traded in the NWE region are categorized based on their sulfur content. The most popular and widely used grade is the 3.5% high sulfur fuel oil which is the subject of this

<sup>7</sup> [https://www.theice.com/publicdocs/futures/ICE\\_Futures\\_Europe\\_Brent\\_Index.pdf](https://www.theice.com/publicdocs/futures/ICE_Futures_Europe_Brent_Index.pdf)

analysis, followed by the 1% low sulfur fuel oil. It is common market practice to use the two different grades as benchmarks to trade and to price the commodity.

The Joint Oil Data Initiative (JODI) reports fuel oil data for Northwest Europe per country rather than reporting a single data point for the Northwest Europe region. The Northwest Europe region is representative of Belgium, Northern France, Germany and the Netherlands. As such, since the JODI data reported for France is not broken down into activity in Northern France versus activity in the French Mediterranean region, the Exchange determined, in consultation with market participants, that a conservative accounting of activity located in Northern France shall be to only account for 50% of total activity in France.

Additionally, since fuel oil data does not differentiate between high and low sulfur, the Exchange relied on statistics published by Eurostat, as presented below, to further break down fuel oil data and extract deliverable supply for high sulfur.

According to JODI data, Northwest European fuel oil production averaged around 2.08 million metric tons per month over the three-year period from June 2013 to May 2016 (see Table 3), which is equal to approximately roughly 24.94 million metric tons per year.

Additionally, Northwest European fuel oil imports averaged around 3.68 million metric tons per month over the three-year period from June 2013 to May 2016 (see Table 4), which is equal to approximately 44.12 million metric tons per year.

Eurostat<sup>8</sup> breaks down the data between low and high sulfur fuel oil. There are two categories of fuel oil classified by Eurostat - fuel oil with sulfur content of less than 1% which we have defined as low sulfur fuel oil, and fuel oil with sulfur content equal to or greater than 1% which we have defined as high sulfur fuel oil. We have looked at the refinery production and import data in Belgium, France (halved) and the Netherlands for the period from May 2013 to April 2016 as shown in Table 5 below whilst Germany has not reported the split between high and low sulfur fuel oil for the period. We believe that this broadly represents a good sample of Northwest Europe. Based on the Eurostat data, we estimate the split between the two grades of fuel oil to be 77.1% of the supply as high sulfur fuel oil and 22.9% of the supply as low sulfur fuel oil. These splits have been applied to the JODI data for fuel oil production and imports.

**Table 3. NWE Fuel Oil Refinery Production Volume**

Units: Thousand Metric Tons

Source: JODI<sup>9</sup>

	<b>Belgium</b>	<b>France*</b>	<b>Germany</b>	<b>Netherlands</b>	<b>Total</b>
Jun-13	454	272	712	616	2,054
Jul-13	405	270	608	662	1,945
Aug-13	334	292	583	689	1,898
Sep-13	399	248	520	623	1,790
Oct-13	314	220	701	621	1,856
Nov-13	333	260	549	842	1,984
Dec-13	458	255	610	707	2,030

<sup>8</sup> [http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg\\_102m&lang=en](http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_102m&lang=en) under Products item: Fuel oil-low Sulphur (<1%) and Fuel oil-high Sulphur (>=1%)

<sup>9</sup> <http://www.jodidb.org/TableViewer/tableView.aspx?ReportId=57432> Secondary products table (Fuel oil, Refinery Output)

Jan-14	420	287	662	755	2,124
Feb-14	482	276	610	733	2,101
Mar-14	487	270	696	758	2,211
Apr-14	493	251	682	736	2,162
May-14	467	278	665	782	2,192
Jun-14	499	243	462	540	1,744
Jul-14	395	262	691	586	1,934
Aug-14	517	292	686	649	2,144
Sep-14	342	263	551	710	1,866
Oct-14	391	250	673	867	2,181
Nov-14	505	262	645	708	2,120
Dec-14	454	308	671	675	2,108
Jan-15	528	252	796	666	2,242
Feb-15	477	272	715	704	2,168
Mar-15	561	330	723	637	2,251
Apr-15	419	235	738	758	2,150
May-15	384	242	642	694	1,962
Jun-15	231	162	492	529	1,414
Jul-15	370	225	722	550	1,867
Aug-15	363	257	744	712	2,076
Sep-15	308	320	462	724	1,814
Oct-15	375	325	631	798	2,129
Nov-15	617	270	640	682	2,209
Dec-15	540	286	647	948	2,421
Jan-16	421	302	760	1035	2,518
Feb-16	417	298	608	879	2,202
Mar-16	432	291	611	836	2,170
Apr-16	460	280	666	1200	2,606
May-16	405	249	491	1053	2,198
<b>3 Yr Average</b>	<b>429</b>	<b>268</b>	<b>641</b>	<b>741</b>	<b>2,079</b>

\*France volume has been reduced by 50%

Table 4. NWE Fuel Oil Imports Volume

Units: Thousand Metric Tons

Source: JODI<sup>10</sup>

	Belgium	France*	Germany	Netherlands	Total
Jun-13	409	199	226	2,694	3,528
Jul-13	466	199	198	2,746	3,609
Aug-13	508	213	279	2,800	3,800
Sep-13	403	244	161	2,726	3,534
Oct-13	313	174	243	2,339	3,069
Nov-13	390	214	220	3,048	3,872
Dec-13	353	289	175	2,531	3,348

<sup>10</sup> <http://www.jodidb.org/TableViewer/tableView.aspx?ReportId=57432> Secondary products table (Fuel oil, Imports)

Jan-14	367	235	223	2,791	3,616
Feb-14	267	144	255	2,767	3,433
Mar-14	346	261	153	2,641	3,401
Apr-14	341	263	285	3,070	3,959
May-14	293	326	207	2,906	3,732
Jun-14	227	241	189	2,528	3,185
Jul-14	392	246	251	2,758	3,647
Aug-14	346	246	253	3,409	4,254
Sep-14	356	212	200	3,027	3,795
Oct-14	374	135	166	2,519	3,194
Nov-14	209	214	167	3,050	3,640
Dec-14	334	152	139	3,318	3,943
Jan-15	353	138	221	3,165	3,877
Feb-15	392	69	144	3,067	3,672
Mar-15	302	125	146	3,937	4,510
Apr-15	295	115	126	3,131	3,667
May-15	297	133	139	3,724	4,293
Jun-15	338	94	214	3,020	3,666
Jul-15	393	151	216	3,114	3,874
Aug-15	380	174	160	3,197	3,911
Sep-15	318	125	111	2,900	3,454
Oct-15	377	132	150	2,943	3,602
Nov-15	298	87	108	2,739	3,232
Dec-15	266	180	186	3,621	4,253
Jan-16	368	178	170	2,632	3,348
Feb-16	358	129	238	2,619	3,344
Mar-16	350	184	278	2,978	3,790
Apr-16	336	217	198	2,446	3,197
May-16	292	233	210	3,394	4,129
<b>3 Yr Average</b>	<b>345</b>	<b>185</b>	<b>195</b>	<b>2,953</b>	<b>3,677</b>

\*France volume has been reduced by 50%

Table 5. Belgium, France and the Netherlands Fuel Oil Transformation Output and Imports Volume by Sulfur content\*

Units: Thousand Metric Tons

Source: Eurostat

Sulfur Content	Belgium		France*		Netherlands		Total	
	<1%	>=1%	<1%	>=1%	<1%	>=1%	<1%	>=1%
May-13	267	585	167	364	863	2,609	1,297	3,558
Jun-13	257	606	168	302	728	2,582	1,153	3,490
Jul-13	374	497	178	291	726	2,713	1,278	3,501
Aug-13	300	542	158	346	711	2,784	1,169	3,672
Sep-13	343	459	171	321	775	2,581	1,289	3,361
Oct-13	366	261	148	246	883	2,087	1,397	2,594
Nov-13	337	386	160	314	950	2,948	1,447	3,648

Dec-13	373	438	231	313	864	2,377	1,468	3,128
Jan-14	397	390	189	333	763	2,762	1,349	3,485
Feb-14	308	441	95	326	692	2,809	1,095	3,576
Mar-14	433	400	143	387	757	2,642	1,333	3,429
Apr-14	409	425	187	327	668	3,136	1,264	3,888
May-14	373	387	148	456	1,087	2,602	1,608	3,445
Jun-14	315	411	141	342	771	2,297	1,227	3,050
Jul-14	337	450	195	313	684	2,660	1,216	3,423
Aug-14	309	554	167	371	928	3,130	1,404	4,055
Sep-14	221	477	147	329	677	3,059	1,045	3,865
Oct-14	240	525	143	242	920	2,465	1,303	3,232
Nov-14	169	545	173	303	819	2,940	1,161	3,788
Dec-14	228	560	135	325	837	3,154	1,200	4,039
Jan-15	103	778	121	269	696	3,135	920	4,182
Feb-15	100	769	107	234	643	3,128	850	4,131
Mar-15	116	747	127	328	688	3,886	931	4,961
Apr-15	42	672	137	245	645	3,245	824	4,162
May-15	75	606	131	244	906	3,515	1,112	4,365
Jun-15	59	510	87	169	737	2,813	883	3,492
Jul-15	55	708	84	292	773	2,893	912	3,893
Aug-15	90	653	146	284	811	3,099	1,047	4,036
Sep-15	50	576	178	267	649	2,976	877	3,819
Oct-15	42	710	228	230	877	2,865	1,147	3,805
Nov-15	37	878	118	239	654	2,767	809	3,884
Dec-15	67	739	134	332	533	4,036	734	5,107
Jan-16	65	724	104	375	693	2,974	862	4,073
Feb-16	80	695	105	322	699	2,801	884	3,818
Mar-16	77	708	109	367	667	3,149	853	4,224
Apr-16	66	730	129	367	815	2,833	1,010	3,930
<b>3 Yr Average</b>	<b>208</b>	<b>571</b>	<b>147</b>	<b>309</b>	<b>766</b>	<b>2,901</b>	<b>1,121</b>	<b>3,781</b>

\*France volume has been reduced by 50%

\*\* Germany has not reported the split between high and low sulfur fuel oil for the period

### **The Singapore Fuel Oil Market**

Singapore, possessing extensive storage capacity and appropriate refining infrastructure, is the main trading hub for the Asian fuel oil market. The country is a vibrant import and export center for petroleum products—it is very dependent on imports as it is a supply center for much of Asia, including China, where cargoes will often be blended and shipped outside of Singapore. The Singapore petroleum markets are extremely diverse and actively traded by refiners, traders, importers and smaller distributors, which explains the numerous energy trading firms located there.

The two main grades of fuel oil traded in the Singapore region are categorized based on their sulfur content. The most popular and widely used grade is the 380cst high sulfur fuel oil which is the subject of this analysis, followed by the 180cst low sulfur fuel oil.

The 180cst and 380cst fuel oil grades are part of the “residual” fuel oil segment in Singapore. This grade of oil is used by the utilities and shipping industries and can also be used as refinery input to produce additional petroleum products via a more intense conversion process which breaks down high sulfur molecules to lower sulfur ones.

The Singapore Energy Markets Authority (EMA) incorporates fuel oil production for Singapore under “Heavy Distillates & Residuum.” Heavy Distillates and Residuum also includes other heavy fuel products such as VGO. Based on market sources, the most conservative estimate suggests that the reported data under Heavy Distillates and Residuum should be reduced by 25% meaning that fuel oil only represents around 75% of reported production. Please note that the EMA reports import data for fuel oil and does not comingle such data with other heavy distillates. EMA publishes fuel oil imports data through 2015 whereas production of Heavy Distillates and Residuum data is reported through 2014. The Exchange opted to use the common timeframes of 2012 – 2014 average production and imports data for the purpose of calculating the deliverable supply. The additional imports data for 2015 is provided below for illustrative purposes.

As the EMA does not distinguish between high and low sulfur fuel oil, the Exchange surveyed brokers and trading firms active in the Singapore fuel oil markets and also reviewed the volume of physical fuel oil transactions for 380cst and 180cst quality material as traded in the Platts window. Based on the confirmations of the relative sizes of both markets by the active participants surveyed, the split between the two grades of fuel oil is around 60% for 380cst and 40% for 180cst material. This split is consistent with the split in transactions in the Platts window.

The EMA publishes production data for Heavy Distillates and Residuum up to year 2014, and for imports data for fuel oil, year 2015. According to the EMA data, and accounting for 75% of reported production for Heavy Distillates and Residuum, Singapore fuel oil production averaged around 10.31 million metric tons per year over the three-year period from 2012 to 2014 (see Table 6), which is equal to roughly 858.79 thousand metric tons per month.

Additionally, Singapore fuel oil imports averaged around 61.81 million metric tons per year over the three-year period from 2012 to 2014 (see Table 7), which is equal to approximately 5.15 million metric tons per month.

Table 6. Singapore Heavy Distillates & Residuum Refinery Production Volume<sup>11</sup>

Units: Thousand Metric Tons

Source: Singapore Energy Markets Authority (EMA)

	2012	2013	2014	3 Year Average (2012, 2013, 2014)
Heavy Distillates & Residuum	14,735.0	14,495.8	11,991.3	<b>13,740.7</b>
(75% of total volume to represent true fuel oil volume below)				
Fuel Oil	11,051.3	10,871.9	8,993.5	<b>10,305.5</b>
(60% of total fuel oil volume to represent 380cst fuel oil volume below)				
380cst Fuel Oil	6,630.8	6,523.1	5,396.1	<b>6,183.3</b>

Table 7. Singapore Fuel Oil Imports Volume<sup>12</sup>

<sup>11</sup>

[https://www.ema.gov.sg/cmsmedia/Publications\\_and\\_Statistics/Publications/SES/2016/Singapore%20Energy%20Statistics%202016.pdf](https://www.ema.gov.sg/cmsmedia/Publications_and_Statistics/Publications/SES/2016/Singapore%20Energy%20Statistics%202016.pdf) Table 2.6

Units: Thousand Metric Tons

Source: Singapore Energy Markets Authority (EMA)

	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>3 Year Average (2012, 2013, 2014)</b>
Fuel Oil	59,444.4	63,691.9	62,279.9	69,902.8	<b>61,805.4</b>
(60% of total volume to represent 380cst fuel oil volume below)					
380cst Fuel Oil	35,666.6	38,215.1	37,367.9	41,941.7	<b>37,083.2</b>

## **Analysis of Deliverable Supply**

The Commission defines deliverable supply as the quantity of the commodity meeting a derivative contract's delivery specifications that can reasonably be expected to be readily available to short traders and saleable by long traders at its market value in normal cash marketing channels at the derivative contract's delivery points during the specified delivery period, barring abnormal movement in interstate commerce."<sup>13</sup>

Both of the new option contracts are crack spread contracts, therefore the Exchange proposes the position limits for each of the options contracts to be aggregated into the corresponding individual outright contracts that are currently listed on the Exchange. The 3.5 % Fuel Oil Barges FOB Rdam (Platts) Crack Spread (1000mt) Average Price Option (BCO) will aggregate into European 3.5% Fuel Oil Barges FOB Rdam (Platts) Futures (Code UV) and Brent Crude Oil Penultimate Financial Futures (Code BB). The Singapore Fuel Oil 380cst (Platts) Brent Crack Spread (1000mt) Average Price Option (SCO) will aggregate into Singapore Fuel Oil 380 cst (Platts) Futures (Code SE) and Brent Crude Oil Penultimate Financial Futures (Code BB).

### **Brent Crude Oil (BFOE)**

The basis of the analysis in the Brent market is BFOE loadings in the North Sea. The Exchange determined that the volume of loaded barrels of BFOE crude oil from Brent, Forties, Oseberg and Ekofisk best meets the definition of supply readily available for delivery. In addition, the Exchange has reduced the deliverable supply of Forties to account for the long term commitment for crude oil purchases by the Grangemouth refinery. The Grangemouth oil refinery is located close to the delivery point of the Forties pipeline and volumes from the outer fields are connected directly via a series of pipelines to the refinery<sup>14</sup>.

Based on the most recent 3-year average of the Bloomberg data on BFOE loadings (August 2013 to July 2016), total loadings of Brent (BFOE) crude oil was approximately 883,879 barrels per day, which is equivalent to approximately 26.5 million barrels per month, or 26,500 contract equivalents (contract size: 1,000 barrels). Further, to account for the crude oil purchases by the Grangemouth refinery, the deliverable supply (using the three-year average BFOE figures) would be reduced by 3 million barrels per month<sup>15</sup>. Therefore, the total deliverable supply of BFOE is approximately 23.5 million barrels per month which is equivalent to 23,500 contracts.

The current spot month limits for the Brent Crude Oil Futures is 4,000 which account for 17.02% of the monthly deliverable supply.

### **NWE Fuel Oil**

The Exchange determined that the sum of refinery output of high sulfur fuel oil and imports of high sulfur fuel oil into Northwest Europe best meets the definition of the supply of high sulfur fuel oil readily available for delivery.

---

<sup>13</sup> See Appendix C to 17 CFR part 38

<sup>14</sup> [http://www.bp.com/en/global/forties-pipeline/about\\_fps/Technical/technical\\_information.html](http://www.bp.com/en/global/forties-pipeline/about_fps/Technical/technical_information.html) - BP Forties Pipeline system

<sup>15</sup> Market suggests 50% of the processing capacity for Grangemouth is Forties therefore we have reduced the deliverable supply of Forties by 3-million barrels per month (the full capacity of the refinery is 6 million barrels per month).



Based on JODI data, the deliverable supply of fuel oil in Northwest Europe (Belgium, France (50%), Germany and the Netherlands) is approximately 5.76 million metric tons per month (sum of production and imports) for the three-year period from June 2013 to May 2016. Using the approximate figure of 77.1% as the proportion of the fuel oil in the Northwest Europe market that is comprised of high sulfur grade in accordance to Eurostat, the estimated deliverable supply of high sulfur fuel oil in NWE is approximately 4.44 million metric tons per month or 4,440 contract equivalents (contract size 1,000mt).

The current spot month limits for the European 3.5% Fuel Oil Barges FOB Rdam (Platts) Futures is 500 contracts which account for 11.26% of the monthly deliverable supply.

### **Singapore Fuel Oil**

The Exchange determined that the sum of Singapore production of high sulfur fuel oil and imports of high sulfur fuel oil into Singapore best meets the definition of the supply of high sulfur fuel oil readily available for delivery.

Based on the EMA data, the deliverable supply of fuel oil in Singapore is approximately 6.01 million metric tons per month (sum of 75% of Heavy Distillates and Residuum production and imports of fuel oil). Using the approximate figure of 60% as the proportion of the fuel oil in Singapore that is of high sulfur grade, the estimated deliverable supply of 380cst fuel oil is approximately 3.61 million metric tons per month. This equates to 3,610 contract equivalents (contract size 1,000mt).

The current spot month limits for the Singapore Fuel Oil 380 cst (Platts) Futures is 500 contracts which account for 13.85% of the monthly deliverable supply.