

## Methodology and Specifications Guide

### Crude Oil

<b>Introduction</b>	<b>2</b>	<b>Persian Gulf</b>	<b>14</b>
<b>North Sea</b>	<b>2</b>	Dubai and Oman	14
Brent	2	Dubai/Oman partials assessment methodology	15
Dated Brent	2	Other Persian Gulf crudes	16
Platts cash BFOE assessment methodology	3	Asian Dated Brent	17
Brent CFDs	4	Asian Dated Brent Strip and Differentials	17
Forties and the de-escalator	4	<b>Asia-Pacific</b>	<b>18</b>
Other BFOE Grades	5	The Platts Asian Crude Oil Index	19
Other North Sea grades	5	<b>United States</b>	<b>20</b>
<b>Brent-related crudes, and the forward curve</b>	<b>5</b>	Consideration of fixed, differential exchange for physical and floating price information	20
<b>Market on Close</b>	<b>5</b>	US domestic grades London close	20
<b>West Africa</b>	<b>7</b>	Americas Crude Marker (ACM)	20
Time cut-offs	8	Americas Crude Marker Methodology	21
Grades	8	Americas Dated Brent	22
<b>Mediterranean</b>	<b>10</b>	Grades	22
Timing	10	US crude oil postings	23
Assessment Timestamp	10	<b>Latin America</b>	<b>23</b>
Time Cut-offs	10	<b>Canada</b>	<b>24</b>
Incrementability	10	Postings-based	24
Nomination	10	Spot-based	25
Date range	10	Canadian crude oil postings	25
Loading locations	10	<b>Unscheduled NYMEX Closures</b>	<b>25</b>
Volume	11	<b>Trading platforms</b>	<b>26</b>
Ship acceptability	11	<b>Code list for Crude Oil Marketwire</b>	<b>27</b>
Grades	11		

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## INTRODUCTION

The following crude specifications guide contains the primary specifications and methodologies for Platts crude oil cargo and pipeline assessments throughout the world. The various components of this guide are designed to give Platts subscribers as much information as possible about a wide range of methodology and specification issues.

This methodology is current at the time of publication. Platts may issue further updates and enhancements to this methodology and will announce these to subscribers through its usual publications of record. Such updates will be included in the next version of the methodology. Platts editorial staff and managers will usually be ready to provide guidance when assessment issues require clarification.

Should you need any additional editorial information please feel free to contact our editorial or sales offices by phone or by using the free "Ask Us" editorial questions email service that can be found on our web site at [www.platts.com](http://www.platts.com). You can also reach our sales team by email at [info@platts.com](mailto:info@platts.com).

## NORTH SEA

The window of assessment for North Sea crude grades is typically 10-21 days from date of publication (for dated Brent/Forties/Oseberg/Ekofisk, the window reflected is 10-21 days Monday-Thursday, and 10-23 days on Friday). North Sea crude grades are generally traded as a differential to dated Brent or as a differential to cash BFOE.

All grades are assessed on a Market on Close basis, with assessment values aligned to 16.30:00 London time precisely. In order to ensure proper dissemination of market information and performance, new bids/offers published by Platts on page 3 of its Platts Global Alert electronic screen service (PGA003) must be received by Platts no later than the published cut-off periods. For physical north Sea bids and offers, the cut-off is currently 16.10:00; for Brent spread and CFD bids and offers the cut-off is currently 16.15:00; for cash BFOE bids and offers, the cut-off is currently 16.20:00 London time. For North Sea, Brent spread and CFDs, prices may be changed incrementally until 16.25:00 London time while cash BFOE bids and offers may be changed incrementally up until the 16.30:00 close. The time cut-off for offers of Brent Blend on a ship-to-ship (STS) Scapa Flow basis is 15.30:00 London time. Please note that the purpose of these time cut-offs and standards of incrementability and repeatability are primarily logistical, and designed to ensure orderly price discovery. As such, they may be changed at short notice if evolving market conditions require. Please note that up until October 1, 2005, the North Sea assessments reflected a 17.30:00 London time close and the time cut-offs for submission of new bids and offers were an hour later than those currently applied.

## BRENT

Physical Brent crude oil represents commingled crude from the Brent and Ninian systems, slated to load at the Sullom Voe terminal. Currently, the API gravity is estimated at 38 degrees and the sulfur content at 0.45% sulfur, but the qualities of all crude oils tend to change over time.

Platts no longer assesses a Brent-only price, due to problems resulting from the decline in its production to a relatively low level. Beginning in mid-2002, Platts substituted for straight Brent a combination of Brent/Forties/Oseberg known as BFO. In 2007, Platts incorporated Ekofisk into the assessment price formation for Dated Brent, giving rise to BFOE. However, the nomenclature for Brent did not change, and Platts still refers to its key wet assessment as Dated Brent, and its key paper assessments as Brent. Platts also launched a North Sea Light assessment which is identical to the Brent price.

Platts makes three forward assessments for 21-day cash BFOE, which represent Platts forward Brent assessments. 21-day cash BFOE is also commonly known as cash BFOE or paper BFOE and the assessment reflects the value of a cargo with physical delivery within the month specified in the contract. The name 21-day name stems from the practice of notifying buyers of the loading dates for their cargoes 21 days in advance of the delivery. The assessed level reflects the tradeable value for full and partial cargoes on the 21-day BFOE market.

The Platts assessment for the front-line 21-day BFOE assessment expires on the last business day of the calendar month. For example, July 21-day BFOE will last be assessed on June 30. On July 1, August BFOE becomes the first month, September BFOE becomes the second month, and October BFOE is added as the third month. The process will repeat itself on July 31.

For more information on the Market on Close methodology used to assess BFOE, please see the section below.

## DATED BRENT

A rolling assessment that reflects the price of physical, wet Brent-Forties-Oseberg-Ekofisk cargoes loading no less than ten days forward. Specifically, dated Brent cargoes loading 10-21 days forward will be taken into account Monday through Thursday. On Friday, dated Brent cargoes loading 10-23 days forward will be taken into account. Deals done, as well as bids and offers, may be taken into account for assessment purposes. Changes in spread trade may also be considered. The cargoes are loaded FOB terminal and may include stored material at each location. Since January 2001, Platts may also consider ship-to-ship transfers at Scapa Flow of Brent crude oil that has been recently loaded at Sullom Voe and remains in its original condition, and provided the seller agrees to cover all additional costs incurred by the buyer who agrees to lift the oil on a STS basis. In September 2006 the ex-ship offer mechanism was broadened to the

evaluation of Forties and Oseberg crude, which form part of the BFOE complex.

## PLATTS CASH BFOE ASSESSMENT METHODOLOGY

In July 2002, Platts broadened its definition of Brent crude oil and included market activity in Forties and Oseberg crude markets in the Platts Dated Brent assessment and the Platts forward cash Brent assessment. Ekofisk was added to the system in June 2007. Platts daily spot price assessments for forward cash Brent months include activity in all four North Sea benchmark grades, Brent, Forties, Oseberg and Ekofisk (BFOE). All aspects of the BFOE assessment methodology were developed by Platts and are proprietary to Platts. Platts continues to assess separate spot values for Oseberg, Forties and Ekofisk.

**Rationale for the BFOE combination:** The production of Brent has fallen over time. Given its role as a key benchmark, the Brent price at times became increasingly disconnected from that of other similar grades. Platts conducted extensive consultations with the industry, and came to the conclusion that its Brent assessment would be more reflective of market fundamentals in the North Sea if the assessment was broadened to include Oseberg and Forties crude oil. Platts implemented this change in July 2002. In 2007 Ekofisk was added to the complex to further bolster the volume available for assessment. Further changes are likely if production of the key grades is deemed too low or if their qualities were to deviate significantly from the norm.

Platts' Brent assessments incorporate the values of Brent, Oseberg and Ekofisk with the most competitive grade setting the price at the margin. If Brent is the most competitive grade then Brent will be the most important factor setting the assessment. Brent has historically been the most competitive grade, with Oseberg, Forties and Ekofisk typically trading above Brent on a flat price basis. The methodology operates as a relief valve, with the other grades influencing the assessment only if the price of Brent disconnects from those of other North Sea grades.

Most grades in the North Sea are light and low in sulfur, with Oseberg and Ekofisk fairly close in quality, price and geographical location to Brent. Oseberg and Forties were originally considered the closest grades, add substantial volume and historically have been worth more than Brent. This allows them, together with Ekofisk, to act as a "price cap" on upward squeezes in the Brent market without causing any flat price distortions in Brent.

Since the start-up of the Buzzard field in January 2007, the quality of Forties has changed significantly. With effect from June 7th, Platts has implemented a quality standard for Forties crude assessments. Platts, from this date, assesses crude meeting 37 degree API minimum and 0.6 pct sulfur maximum content in Forties. Platts will continue to review the situation to ensure its assessments reflect normal and standard grades.

**Methodology:** The most competitive grade at the margin will

under typical circumstances be the grade reflected in the assessment. Under normal market conditions, the most competitive grade has been Brent and the inclusion of Forties, Oseberg and Ekofisk should not alter the prevailing price of Brent. However, the inclusion of Buzzard into the Forties stream has meant Brent is often not the most competitive grade. This methodology neither adds nor subtracts barrels from the overall crude oil marketplace, but adds volume to the benchmark to ensure it continues to reflect supply/demand fundamentals. Supply and demand remain unchanged.

Platts does not average the price of Brent, Oseberg, Forties and Ekofisk to set its Dated Brent assessment. The most competitive grade at the margin will have the greatest degree of influence in the assessment.

**Timing:** Backwardation and contango are factored in the assessment process. If a company offers a cheap cargo loading 10 days forward, the offer would only influence at the most the Platts assessment for cargoes loading 10 days forward. Platts would still need to assess days 11 through 21 and publish an assessment that is inclusive of market value from 10-21 days forward. The range stretches to 23 days for Friday assessments.

Platts previously had a 7-15 day range. But most other North Sea grades trade with loading dates further into the future than Brent. Platts' objective was to bring its Dated Brent assessments more in line with market practice in the North Sea. Hence, Platts implemented a change to reflect cargoes with loading dates 10-21 days forward, Monday to Thursday, and 10-23 days forward on Friday.

*An example:*

- Forties loading 16-18 July sold at Dated Brent plus \$0.10/bbl
- Brent loading 16-18 July sold at August Brent plus \$0.10/bbl

In order to assess these transactions Platts would need to determine the value of August Brent and the value of the underlying Brent swap, also known as the CFD, covering the loading period for the Forties cargo. (For more information on CFDs, see the section entitled Brent CFDs). If as an example, the value of August Brent is \$65.00, then the Brent loading 16-18 July would be assessed at \$65.10/bbl. For the Forties assessment Platts would then determine the flat price value of the dated Brent CFD covering the loading/pricing. In this example, the dated Brent CFD for the pricing period (week of July 15-19) was valued at August Brent minus 10 cts/bbl to an equivalent of \$64.90/bbl. Platts would then add/subtract the differential at which the Forties cargo was sold. In this case Forties was sold at a positive differential of \$0.10/bbl, leading to a fixed price equivalent of \$65.00/bbl. The most competitive grade in this example is Forties and the assessed value for Platts dated Brent would be \$65.00/bbl for cargoes loading around July 17. Platts would still need to assess all the other days in the 10-21 day range used for the assessment.

**Operational tolerance:** Platts reflects in its assessments cargoes loading ‘within’ 1% plus or minus operational tolerance. In the event that Platts would encounter transactions with a 1% plus or minus commercial tolerance defined before the cargo loads and transactions with a 1% plus or minus operational tolerance due to normal terminal operations, Platts would reflect the latter. Platts believes that cargoes trading with pre-known tolerances ahead of the actual cargo loading include an option value that distorts the true value of the assessed commodity.

**Terms & Conditions:** Offers/bids/transactions for forward Brent, Oseberg, Forties and Ekofisk, or BFOE, as previously announced, are used for assessment purposes in the forward daily Brent monthly Platts assessments. The bids/offers and transactions are recognized for assessment purposes provided they meet the following conditions:

- Cargo date nominations are declared 21 days in advance.
- Cargoes load under normal terms and conditions.
- Normally, Forties cargoes are loaded under BP’s terms and conditions, Brent cargoes are loaded under Shell’s terms and conditions, Oseberg cargoes are loaded under Statoil’s terms and conditions, and Ekofisk under ConocoPhillips’ terms and conditions.
- Any partials that are not fully and satisfactorily recombined into full cargoes of 600,000 bbl would need to be booked out under normal terms and conditions currently prevailing for a Brent book out. If a partial is not commercially booked out, then the partial would need to be priced out on the Brent assessments on the same basis as Brent partials are booked out.
- If Brent, Oseberg, Ekofisk or Forties is delivered under a BFO basis, each cargo size shall be 600,000 bbl.

**BRENT CFDS**

Brent CFDS (Contract For Difference) are relatively short-term swaps, quoted by Platts for each of eight weeks ahead of the current date at any one time. They also are traded for bi-monthly and monthly periods in the marketplace. They represent the market differential in price between the Dated Brent (BFOE) assessment and a forward month cash contract, i.e. forward month “BFOE” (Brent-Forties-Oseberg-Ekofisk) cash contract, over the period of the swap.

The first weekly balance is on a forward week basis on Thursday and Friday, and becomes a balance week quotation between Monday and Wednesday. It is rolled forward every Thursday. Second week onward assessments are all forward week assessments. Assessments are quoted as a differential to the second BFOE cash contract month, e.g on July 23rd, the assessment would be against September cash BFOE. The relevant cash month rolls on the first day of the month of each month

e.g. June will become the basis month on April 1.

CFDs are a means for holders of long or short BFOE cash positions to hedge against or speculate in movements in the dated Brent market. The CFD swap is between the uncertain or “floating” price of the dated Brent differential and a certain or “fixed” differential price, which generally is Platts’ daily dated Brent crude assessment. CFDs are priced using averages of a particular week’s worth of daily price assessments as quoted by Platts.

Each trade is an exchange of a fixed for a floating risk in the Dated to BFOE cash differential.

CFDs are generally traded in clips of 100 lots, i.e. 100,000 barrels. In addition to Dated Brent (BFOE), CFDs are also used to price crudes which are sold at a differential to Dated Brent.

**FORTIES AND THE DE-ESCALATOR**

The assessment for Forties blend is based on FOB Hound Point, UK. Currently, the API gravity of Forties is 40.3 degrees and the sulfur content is around 0.58%. The assessment reflects values for cargoes loading 10-21 days forward Monday-Thursday and 10-23 days forward on Friday.

In June 2007 Platts introduced a quality standard into its Forties assessments when maintenance-led quality disruptions began to occur. As of July 2, 2007, Platts considers Forties in its assessments of Dated Brent and related North Sea instruments with a quality de-escalator applied for deliveries above the base standard of 0.60% sulfur. Platts considers in its assessments bids, offers and deals where a de-escalator of 60 cents/barrel for every 0.10 per cent of sulfur specified. The original value of the de-escalator was set at 40 cts/barrel but this was revised to 60 cts/barrel on June 30, 2008. The de-escalator will be effective until the end of the calendar year unless there is a significant and sustained event in the crude oil market that would necessitate an interim and open review. The Forties sulfur de-escalator changes from time to time and current rates are as published in the Platts Crude Oil Marketwire.

Platts will consider in its assessments bids, offers and deals where a de-escalator of 60 cts/barrel for every 0.1% of sulfur is specified. Under the de-escalator, the seller would pay the buyer this compensatory amount for every 0.1% of sulfur over 0.6% on a pro-rata basis, as follows:

- 0.6% No payment to buyer
- 0.625% Seller pays 15 cts/barrel to buyer
- 0.65% Seller pays 30 cts/ barrel to buyer
- 0.7% Seller pays 60 cts/ barrel to buyer
- 0.8% Seller pays \$1.20/ barrel to buyer
- 0.9% Seller pays \$1.80/ barrel to buyer

## OTHER BFOE GRADES

**Oseberg:** The assessment is based on FOB Sture, Norway. Currently, the API gravity of Oseberg is 37.8 degrees and the sulfur content is 0.27%. The assessment reflects values for cargoes loading 10-21 days forward Monday-Thursday and 10-23 days forward on Friday.

**Ekofisk:** The assessment is based on FOB Teesside, UK. Currently, the API gravity of Ekofisk is 37.5 and the sulfur content is 0.23%. The assessment reflects values for cargoes loading 10-21 days forward.

## OTHER NORTH SEA GRADES

**North Sea Basket:** This is a straight average of the price of Dated Brent, Forties, Oseberg and Ekofisk.

**Statfjord:** The assessment is FOB platform based with a fixed freight element. Currently, the API gravity is 39, and the sulfur content is 0.22%. The assessment reflects values for cargoes loading 10-21 days forward.

**Flotta:** The price is for barrels loading FOB at the Flotta terminal in the North Sea. Currently, the API gravity is 36.9 degrees and the sulfur content is around 0.83%. The assessment reflects values for cargoes loading 10-21 days forward.

## BRENT-RELATED CRUDES, AND THE FORWARD CURVE

Before 2002, Platts assessed Brent-related crudes from the North Sea, Africa and the Mediterranean at a differential to the assessment published for dated Brent on the day. As an example, if Bonny Light was assessed at dated Brent plus \$1.00/bbl on a particular day, then the assessment for the grade that day would reflect that day's dated Brent assessment plus \$1. If the dated price was \$30, Bonny Light would have been \$31. However, this assessment system does not take into account the timing structure of the market, i.e., the contango or backwardation in the market.

Crude cargoes are traded in the spot market for loading sometime in the near future. Some of the cargoes are traded using a benchmark as a reference for the base price plus or minus a differential. The cargoes typically use Dated Brent as the benchmark for the base pricing. The base is typically an average over specific dates related to the time when the cargo will load in the future. For instance, a cargo of Urals can trade on Jan 2 for loading Jan 15. The Urals cargo can be traded at dated Brent around bill of lading time minus \$1.00. Hence, to determine the correct price for Urals it is key to determine the market value of the dated Brent assessments around the bill of lading. As an

example, Platts on Jan 2 would need to determine the value of dated Brent, on a forward basis, around the future bill of lading dates. There is a market for the forward Dated Brent assessments, informally known as the CFD market. Platts regularly assesses the value of CFDs on a weekly basis for 8 weeks ahead of the date of publication. This gives it a solid base for producing assessments on Brent-basis cargoes by taking into account the forward pricing curve.

The assessment methodology used since late 2002 for North Sea grades, and early 2003 for West African and Mediterranean grades, takes into account the contango or backwardation in the marketplace. As an example, if the Bonny Light traded at dated Brent plus \$1.00/bbl and the cargo was due to price on the assessments published by Platts from April 3-April 14, the assessment would be calculated on the following basis: current dated Brent prices, plus CFD differential for the Apr 3-14 time frame, plus the \$1 premium.

Platts will use the future dated Brent value applicable to and typical for each grade. In the case of Mediterranean grades, Platts reflects in its assessments cargoes loading 10-25 days forward. The cargoes typically price 1-5 days after the cargo loads. The average pricing time is therefore 3 days after bill of lading. In this case therefore Platts will need to take into consideration the market value for the dated Brent assessments for days 10-25 plus an additional 3 days. This results in a dated Brent strip of 13-28 days forward.

For Angolan grades, the window of assessments is 15-45 days forward with the cargoes pricing 5 days around bill of lading. Therefore the dated Brent strip Platts needs to take into account is 15-45 days forward. For Nigerian grades, the assessment window is 15-45 days forward, but typically cargoes price in the period 1-5 days from date of loading. Thus the applicable dated strip for Nigerian grades is 18-48 days forward. For Canadian cargo-grades, the assessment window is 28-42 days forward, but typically cargoes price in the period of 1-5 days from the date of loading. Thus the applicable dated strip for Canadian cargo-grades is 31-45 days forward.

Platts assesses three forward months of Brent/BFOE EFPs (exchange for physical). The relevant assessment deltas refers to the corresponding month of Platts Brent/BFOE spot price assessments.

Platts assesses three forward months of Brent/WTI cash spreads. The assessments are based on the London market close at 5:30 p.m. local London time.

## MARKET ON CLOSE

In establishing its daily assessment for 21-day cash BFOE and cash West Texas Intermediate (WTI), cash Mars and all other crude oil spot price assessments, Platts utilizes a system commonly known as Market on Close (MOC).

The MOC system seeks to reflect transactable values prevailing at the respective market close on a normal working day: 4:30 PM local London time for 21-day cash BFOE, and 3:15 PM local NY time for cash WTI and Mars. Platts derives these values by tracking market evolution during the respective assessment window and by making assessments that reflect the value at which a deal could or did take place at the close of the market.

To do this, Platts takes into account representative, arms-length, openly negotiated transactions occurring during the assessment window and additionally taking into account the evolution of the bid-offer spread during this period. Platts, prior to January 2001, produced its assessment from an arithmetic weighted average of deals done during this period. Instead it is using the deals, at whatever time they occur within the window, as a basis for extrapolation to the market-on-close (MOC) assessment.

In order to enhance further transparency and orderliness in the European crude oil pricing window, Platts has established the following timing standards for North Sea physical crude and associated derivatives, such as cash BFOE, dated Brent and other crude oil instruments:

- Initial physical North Sea cargo bid/offers should be submitted no later than 16:10:00 local London time. Platts will consider incremental price changes made to physical bids and offers up to, but no later than, 16:25:00 local London time. Changes to bid/offers should typically not exceed 5 cts/bbl per adjustment.
- Initial BFOE cash spread and CFD positions should be submitted no later than 16:15:00 local London time. Platts will consider incremental price changes made to BFOE cash spreads and CFDs up to 16:25:00 local London time.
- Initial outright BFOE positions should be submitted no later than 16:20:00 local London time. Platts will consider incremental price changes made to BFOE cash positions up to 16:30:00 local London time.

Separately, the following editorial clarifications were published since the Market-On-Close roll out:

- Clarification in regard to Platts Global Alert PGA 3 & 5 trading positions: In the event that a principal is bidding/offering a parcel and starts communication with a counterparty with the aim of executing a transaction, the initial buyer or seller should either 1) communicate that the parcel is no longer available, or 2) make it clear that the parcel is still available to the entire market. If the parcel is still available, any other principal can execute the transaction with the original buyer/seller, despite discussions a seller may have had previously with another potential buyer. If no communication is made it is assumed that the parcel is still available to the marketplace. Furthermore, any transaction originating from a bid or offer posted transparently must be disclosed.
- North Sea cargo offers made with wide loading ranges

where seller holds the option on the actual loading dates are not used in the assessment process. The standard for cargoes loading in the North Sea is a three day loading range. Offers of dated cargoes made for wide loading date ranges should specify clearly if option resides on seller. Bids on same basis are typically presumed to grant the optionality to the seller.

- Platts assessments consider bids, offers and transactions that are transparent and executable by any creditworthy counterparty. Bids, offers or transactions that are not transparent will not be considered in the assessment process. Naturally, bids above transparent offers or offers below transparent bids are not considered in the assessment process. Platts considers changes to bids or offers when those changes are done transparently and in normal increments. The level of each bid or offer must stand firm in the marketplace long enough for any counterparty to hit the bid or lift the offer, otherwise the bid or offer may be deemed inexecutable. Platts does not consider bids, offers or transactions that are the result of market gapping, i.e. changes that are in excess of normal market practice.
- Platts MOC assessment process requires that market participants bidding and offering in the MOC window perform on their bid/offer with the first company of record. In the event of a dispute on the timing, Platts will review its records and determine which company communicated to Platts first its intention to execute on a bid/offer displayed on the Platts systems. All the Platts systems operate on a first come, first served basis. This sequence is critical for orderly price discovery

The minimum volume that Platts takes into consideration for cash BFOE assessment is 50,000 bbl with a maximum of 600,000 bbl per transaction. For WTI the minimum is 25,000 bbl with a maximum of 600,000 bbl per transaction. These minimums and maximums are a reflection of standard market practices and may be subject to review if market conditions change.

Platts will assess the market as per the respective London and New York close, and would use in its assessments any information deemed reliable and provided on a transparent basis. In the absence of trade, Platts can use several other indicators, including bids and offers or spread relationships versus other crudes such as WTI.

Platts will use in its assessments any transaction concluded between parties that have expressed their intention to buy or sell on a transparent basis. Typically, the later a player signals their intention to buy or sell, the greater is the possibility that any eventual transaction they engage in is not open or transparent. Platts' confidence in trades evolving from buy-sell intentions signaled before the start of the assessment window will be much greater than its confidence in trades concluded abruptly from late arriving bids and offers, and late signals will therefore be evaluated on a case-by-case basis.

The philosophy behind MOC is that market values can change dramatically in a span of 15 minutes. Platts came to the conclusion that an averaging system for price determination could result in assessments that lag actual market levels, as deals done early in an assessment period, at a level that is not repeatable, could mathematically drag prices down or up.

With an MOC procedure, Platts can reflect market conditions up to the minute. A methodology that works well in a period of low or high volatility, and in periods of high or low contango or backwardation, is a good methodology. A market on close methodology helps achieve those goals.

The prior practice in the Brent and WTI markets of averaging can lead to distortions when the price of one commodity is compared with the price of another, or a price for one month is compared with that for other months. In essence, averaging of transactions results in a quotations that lags the actual market.

As an example, Brent/BFOE crude oil has a value, WTI has a value and the Brent/BFOE versus WTI spread has a value, and all three make sense when measured on a same-time basis. By contrast, a system of averages can lead to distortions in the Brent/BFOE versus WTI spread if the distribution of deals done for WTI and Brent/BFOE differs over the averaging period. Thus if WTI trades actively at the beginning of the assessment window and Brent trades actively at the end of the window in a rising market, the assessed spread value resulting from an averaging process will not be reflective of actual market values.

In a falling market, the averaging would result in a widening of the apparent spread. This distortion can arise even if the value of spread trades in their own right has remained constant. The market on close approach drastically reduces the possibility of such distortions.

Platts follows several other basic price-reporting principles in its MOC system:

- If a deal is done on a non-transparent basis or in circumstances where questions may arise as to why a buyer/seller did not deal in an open environment, where counterparties had enough time to react, or where questions may have arisen as to the time of execution, Platts believes it must take precautions generally to not take such a deal into account. But Platts does recognize that there may be market circumstances in which a player that did not originally intend to trade during the Platts window finds that rapidly changing market conditions make it advisable, or even necessary, to enter the market after the start of the window.
- Platts editors always seek direct verification from the principals to a bid/offer/deal, and will not disintermediate the actual market-maker, whether a deal is done on- or off-line.
- If only one player is active in the market, Platts would only use information from that player if the intention to bid or

offer was made on a transparent basis and within the timing guidelines. Under these circumstances, such a player's bids or offers would clearly be available for execution by any other potential trading counter party.

- Platts is always concerned about the potential effects of "one-off" deals on the market's perception of transactable value. It is common practice among some traders to effect non-repeatable deals at below- or above-market levels in the hope that such deals will influence others' perceptions of value and ultimately in the hope that these deals will affect Platts assessments. A variant on this action is the practice by supposed sellers of "gapping down" their offer to a point well below where a trade might be expected to occur, or of supposed buyers "gapping up" their bids. The test that Platts uses is a process of inquiry to find whether, for example, an unusually high buyer is willing to pay the same amount again and again until all the supply created by his high bid is exhausted. On the reverse side, a seller would need to supply more barrels until he satisfies all the demand generated by a low offer. If buyer or seller fails to satisfy the demand or supply generated in the entire market place, the transaction could be considered non-market and would not be used for the assessment.
- A player can move its bids/offers by any increments it believes fits their trading objectives. However, Platts can only take into consideration those changes in bids and offers, which occur sequentially and with increments that are in line with current market practices. In markets with low volatility, players typically move prices at increments ranging from 1-5 cts/bbl per step, with the increments typically growing as the volatility increases. A market participant can withdraw at any time. However, if a market participant withdraws after a trading counter party has indicated that it has interest to buy or sell into the bid/offer, it would become evident that the original buyer/seller actually had no interest to trade. Platts views spurious bids and offers of this kind with concern, and it takes seriously its responsibility to publish information only from sources deemed credible.

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## WEST AFRICA

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Beginning in 2003, Platts began taking into account backwardation/contango in the underlying Dated Brent market. Prior to the change, Platts West African and Mediterranean grade price assessments were established by adding/subtracting the prevailing market differential against the daily Dated Brent assessment and did not take into account backwardation or contango. Platts incorporated the market structure into all its Dated Brent related spot price assessments by correlating respective loading dates with the corresponding Dated Brent value. The corresponding Dated Brent value is established through trading activity in the Brent/BFOE swap market.

West African grades are assessed for cargoes loading 15-45 days

after date of publication. While a cargo size of 950,000 bbl is the standard in the daily-assessed grades, part-cargoes are occasionally traded and may be factored into the assessment process. Underlying market dynamics may also play a role in determining the value of grades. Market backwardation and contango within the 15-45 day window will be taken into account for assessment purposes in Angolan grades and within a 18-48 day window for Nigerian crude. All West African assessments are on an FOB basis, for loading at each grade's specific terminal.

### TIME CUT-OFFS

In its daily assessments of West African crude oil, Platts reflects cargo bids and offers that are submitted in full to Platts before 15.45 London time. The prices of these bids and offers may be adjusted at a rate of a maximum of 5 cents/barrel per minute. The last price change must be submitted to Platts ahead of 16.25 London time. Platts assessments reflect value at 16.30 London time precisely.

### GRADES

- **Bonny Light:** This crude oil is produced in Nigeria from ChevronTexaco and Shell concessions. ChevronTexaco's exports are throughput and loaded from the Shell-operated Bonny Terminal, which can accommodate Very Large Crude Carrier (VLCC) loading. The typical cargo size is 950 thousand barrels. The API gravity for Bonny Light is 35 degrees and the sulfur content is 0.2%. The typical cargo size for this FOB assessment is 950,000 bbl and the grade loads at the Shell-operated Bonny Terminal. The current bbl/mt conversion factor for Bonny Light crude oil is 7.526 and typical output is around 540,000 barrels per day. Specifications are: API 35.4°, S.G. 0.85, Sulphur 0.14, Pour point -18°C, TAN 0.27 mg KOH/g, Nickel 3.6 wppm, Vanadium 0.4 wppm, Visc. (50°C) 2.9 cSt.
- **Qua Iboe:** The crude oil is produced from numerous offshore fields in the Bight of Biafra in south-eastern Nigeria, east of the Oso field. The crude, from fields, 20 to 40 miles offshore from Nigeria's South Eastern region, are brought to shore via a seabed pipeline system to the Qua Iboe terminal (QIT). Production currently averages around 400kbd. ExxonMobil, as field operator, holds 40% interest in the field production mix with the Nigerian National Petroleum Corporation (NNPC) having the remaining 60%. The API gravity for Qua Iboe is 36 degrees and the sulfur content is 0.1%. The Qua Iboe terminal is operated by ExxonMobil and output is typically around 520,000 b/d. The current bbl/mt conversion factor for Qua Iboe crude oil is 7.45. Other specifications are: S.G. 0.8487, Sulphur 0.1175, Pour point 60°F, TAN 0.32 mg KOH/g, Nickel 4.1 wppm, Vanadium 0.3 wppm, Visc. (20°C) 5.71 cSt.
- **Brass River:** The crude is a typical Nigerian high-quality West African gasoline and gasoil - oriented crude. Its gravity has become heavier over the past few years. Average production: 180,000 bpd. The loading terminal is Brass River operated by ENI and has a storage capacity 400,000 bbl. The crude has a low metal content and a high yield of gasoline and middle distillates with acceptable cetane index. Naphtha With an N+2A > 70, the naphtha is a good feedstock for gasoline production. Specifications are: API 36.25°, S.G. 0.845 conversion rate 7.46, Sulphur 0.13 mass %, Pour point -36 °C, TAN 0.29 mg KOH/g, Nickel 2.0 wppm, Vanadium < 2 wppm, Visc. (40°C) 5.2 cSt.
- **Escravos:** The crude is produced in Nigeria and loaded from the ChevronTexaco-operated Escravos Terminal, which can accommodate Very Large Crude Carrier (VLCC) loading. The typical cargo size is 950 thousand barrels but alternate cargo sizes can be arranged with advance planning. The production rate of the contributing fields is approximately 400 thousand barrels per day. API gravity of 33.0-33.5 degrees and a sulfur content of 0.17-0.18%. The Escravos terminal is operated by ChevronTexaco and the standard output is 475,000 b/d. Other specifications are: S.G. 0.85 conversion rate 7.54, Sulphur 0.15 mass %, Pour point 7 °C, TAN 0.53 mg KOH/g, Nickel 4.8 wppm, Vanadium 0.5 wppm, Visc. (40°C) 4.75 cSt.
- **Forcados:** Forcados is a Nigerian crude with a low sulphur and low metals content. It is rich in distillates and has low fuel content. Average production: 420,000 bpd. Loading location is Forcados terminal. This crude has a larger distillate refining profile. Its API gravity is 30 degrees and has a sulfur content of 0.2% and it loads at the Shell-operated Forcados Terminal on the Niger Delta. The current bbl/mt conversion factor for Forcados crude oil is 7.223. Other specifications: Pour point -27 °C, TAN 0.34 mg KOH/g, Nickel 3.9 wppm, Vanadium 1.0 wppm, Visc. (50°C) 4.6 cSt.
- **Agbami:** The grade is produced 70 miles offshore Nigeria and loads from the Agbami FPSO. Cargoes typically are typically made up of 975,000 barrel and peak production in 2010 is set for 250,000 b/d. Agbami is classified as a light, sweet crude with low acid content. Specifications are: API 47.2°, Sulfur 0.05 mass%, Pour point -1.6°C, TAN <0.05 mg KOH/g, Visc. (40°C) 1.98 cSt. Production began in July 2008.
- **Cabinda:** The crude oil is produced in Angola. It is loaded from the ChevronTexaco-operated Malongo Terminal, which can accommodate Very Large Crude Carrier (VLCC) loading. Nemba also loads at Malongo, and combined cargoes of Cabinda and Nemba on VLCC's are possible. The typical cargo size is 950 thousand barrels, but alternate cargo sizes can be arranged with advance planning. The minimum cargo size is 600 thousand barrels. The production rate of the contributing fields is approximately 270 thousand barrels per day. This medium sweet Angolan crude represents commingled material from the Takula and

Malongo systems. Its API gravity is 32.0 with a sulfur content of 0.12%. The typical Cabinda output from Malongo is approximately 350,000 b/d. The current bbl/mt conversion factor for Cabinda crude oil is 7.28. Other specifications: Pour point 16 °C, TAN 0.06 mg KOH/g, Nickel 16. wppm, Vanadium 2.2 wppm, Visc. (50°C) 9.90 cSt.

-45°C, TAN 1.54 mg KOH/g, Nickel 24 wppm, Vanadium 11 wppm, Visc. (20°C) 117.2 cSt. First cargoes moved December 2006.

In addition to the above grades which are assessed on a daily basis, we continue to assess on a weekly basis Angola's Palanca, Gabon's Rabi Light and Cameroon's Kole. Girassol and Nemba used to be assessed weekly but this has stopped since the grades started to be assessed on daily.

- **Girassol:** The crude is produced from the Girassol and Jasmim offshore fields in Angola. In 2007, production from the Rose field is expected to be brought on stream to keep production at the same level. The operator is Total and the loading port is Offshore Angola. Standard cargo size is 1 million barrels (with the option to increase/decrease) and crude production is 250,000 bbl/day. Girassol is classified as a medium density, low sulphur crude. Specifications are: API 30.8°, S.G. 0.8718 (conversion rate 7.27), Sulphur 0.34, Pour point -24°C, TAN 0.30 mg KOH/g, Nickel 10.0 wppm, Vanadium 5.0 wppm, Visc. (20°C) 19.6 cSt.
- **Hungo:** The crude is produced from the Hungo and Chocalho fields. The operator is ExxonMobil and the loading port is Kizomba A FPSO offshore Angola. Standard cargo size is 1 million bbl (with the option to increase/decrease). Crude production is 210,000 bbl/day. Hungo Blend is classified as a medium density, medium sulphur, medium TAN crude. Specifications are: API 28.5°, S.G. 0.8844 (conversion rate 7.06), Sulphur 0.71 mass%, Pour point -36°C, TAN 0.43 mg KOH/g, Nickel 19.0 wppm, Vanadium 17.0 wppm, Visc. (40°C) 12.9 cSt. Hungo Blend was formerly known as Kizomba A.
- **Kissanje:** The grade is produced from the Kissanje and Dikanza fields and the operator is ExxonMobil. The loading port is Kizomba B FPSO offshore Angola. Standard cargo size is 1 million bbl. Production is 250,000 bbl/day. Kissanje Blend is classified as a medium density, medium sulphur, medium TAN crude. Specifications are: API 28.2°, S.G. 0.8858 (conversion rate 7.06), Sulphur 0.44 mass%, Pour point -21°C, TAN 0.64 mg KOH/g, Nickel 16.1 wppm, Vanadium 5.7 wppm, Visc. (40°C) 15.62 cSt. First cargoes moved end of July 2005.
- **Nemba:** The grade is produced offshore Angola and loads at the Malongo terminal, where Cabinda also loads. The typical cargo size is 950,000 and production typically totals 140,000 b/d. Nemba is categorized as a low density, low sulfur crude. Specifications are: API 38.6°, Sulfur 0.22 mass%, Pour point -6.7°C, TAN 0.18 mg KOH/g, Visc. (40°C) 4.15 cSt, Vanadium 3.83 ppm. Production began at South Nemba in June 1998, with North Nemba following in August 2001.
- **Dalia:** The grade is produced from Block 17 offshore Angola and the operator is Total. The loading port is the FPSO Dalia offshore Angola. Standard cargo size is 950,000 barrels. Production is 240,000 b/d. Dalia is classified as a medium density, low sulfur, medium TAN crude. Specifications are: API 23.6°, Sulfur 0.50 mass%, Pour point
- **Palanca:** The crude oil is produced in Angola from five different concessions. It is loaded from the Total-operated Palanca Terminal, which can accommodate Very Large Crude Carrier (VLCC) loading. The typical cargo size is 985 thousand barrels; however, alternate cargo sizes can be arranged with advance planning. The production rate of the contributing fields is approximately 140 thousand barrels per day. Specifications are: API 37.2°, S.G. 0.8388 (conversion rate 7.5), Sulphur 0.18 mass%, Pour point 10 °C, TAN 0.03 mg KOH/g, Nickel 1.4 wppm, Vanadium 1.1 wppm, Visc. (40°C) 4.52 cSt.
- **Kole:** The crude is a blend of several fields: Kole, Betika, Ekoundou, Asoma and others. Kole is a low sulphur crude (0.3%S), of medium gravity with a suitable jet cut as well as suitable cuts for thermal and catalytic operations. Average production: 70,000 bpd. The terminal is operated by Elf Serepca. Location: Approx. 100 miles West of Douala - Cameroon with maximum cargo size 900,000 bbls (143,000 m3). The crude is naphthenic, low in aromatics and gives good quality reformer feedstock and middle distillates with good cold properties. Specifications are: API 31.51°, conversion rate 7.4, Sulphur 0.35 mass %, Pour point -9 °C, TAN 0.61 mg KOH/g, Nickel 21.2 wppm, Vanadium 8.5 wppm, Visc. (40°C) 4.7 cSt.
- **Rabi Light:** The crude is produced in Gabon from the fields of Rabi, Coucal, Avocette Tchatamba and Azile. Rabi light is a very low sulphur (0.12 %S), light crude (36-37API), particularly suitable for the production of gasoline in a complex refinery, as well as jet fuel, high quality gasoil, lubestocks and very low sulphur fuel oil. Rabi light can be used for direct burning in power generation or utility plant. Average production: 90,000 bpd. Loading location is Terminal Cap Lopez near Port Gentil. The loading berth is located on the west side of Baie du Prince. Cargo Size 130,000 mt. The crude is paraffinic and has high yields of very good quality distillates with very good cetane index. Naphtha With an N+2A of about 56, the naphtha is a very good feedstock for gasoline production. Specifications are: API 36.77°, conversion rate 7.31, Sulphur 0.12 mass %, Pour point 20 °C, TAN 0.05 mg KOH/g, Nickel 10.0 wppm, Vanadium 1.2 wppm, Visc. (40°C) 29 cSt.

## MEDITERRANEAN

### TIMING

Beginning in 2003, Platts' Mediterranean crude assessments began taking into account backwardation/contango in the underlying Dated Brent market. Platts incorporated the market structure into all its Dated Brent related spot price assessments by correlating respective loading dates with the corresponding Dated Brent value. The corresponding Dated Brent value is established through trading activity in the Brent/BFOE swap market. Mediterranean crude grades are assessed 10 to 25 days out, and the forward pricing period applied for Mediterranean market by means of the forward Med strip is 13 to 28 days out. Azeri Light and Azeri, the crude coming out of the BTC pipeline, are assessed 10-30 days out, and the forward pricing period applied by means of the forward BTC strip is 13-33 days out. (Please refer to the section on "Strips" for detailed description of the strips for the Mediterranean.) Prior to the change, Platts West African and Mediterranean grade price assessments were established by adding/subtracting the prevailing market differential against the daily Dated Brent assessment and did not take into account backwardation or contango. Starting from June 1, 2006, Platts is assessing BTC crude FOB Ceyhan basis 10-30 days out and the respective BTC strip is 13-33 days out.

### ASSESSMENT TIMESTAMP

Platts' assessment methodologies for Urals and other crude oils traded in Europe reflect the prevailing market price at 16.30 London time. Platts also takes into its editorial consideration bids, offers and transactions seen during the assessment day. These inputs are analyzed and normalized to reflect a market value at 1630 London time precisely.

### TIME CUT-OFFS

Entry for bids and offers on Urals: Bids and offers may be submitted at any time during the day with a deadline of 15:45.00 London time. Platts synchronizes its computer clocks every day precisely, and will compare the time of any submitted bid/offer or communication by a market participant intending to transact, against the computer time, in order to ensure that the cut-off points for new bids and offers, price changes and the market's close are accurate. Please note that Platts applies the timing deadlines strictly.

For the purposes of clock synchronization, market participants may find the following internet link helpful: [www.time.gov](http://www.time.gov). Please note, however, that Platts does not guarantee the accuracy of this clock. Platts takes steps to ensure its clocks are in line

with true time, and the assessments are synchronized exactly at 16.30 London time.

### INCREMENTABILITY

Submitted bids or offers may be changed by market participants up to 16:25:00 London time. The bids/offers may be changed by small increments in line with ongoing market practice. In markets trading in dollars per barrel, typical increments are 5 cents/bbl for normal market conditions. Trading conditions such as market volatility help determine normal increments.

Changes exceeding those parameters may result in the bids and offers not being reflected in the assessment process. Where transactions are concluded at levels that have not been fully tested by the market because price changes have been nonincremental, assessors may determine that the actual market value is somewhere within that price gap, rather than at the actual level of the transaction.

### NOMINATION

Platts considers in its Urals assessment process cargo bids and offers loading 10-25 days from date of publication. Platts also considers bids made on a minimum five day loading window where buyer grants the right to narrow the two day laycan to the seller. Seller, however, must nominate the actual two day loading laycan at least 7 calendar days in advance of the first day of the five day loading range. Seller must also specify at least 7 days in advance the name of the ship and the loading port.

If the buyer bids for more than five days loading range, the seller should specify a five day laycan at the time of the trade.

Standards are still evolving and further clarifications may be needed if issues arise.

### DATE RANGE

Platts will consider bids that specify a minimum five-day date range (eg. Jan 21-25), as the per subscriber note dated Nov 19, 2004. However, offers that specify a maximum five-day date range will be considered for the assessment, based on FOB loading dates but with CIF pricing terms. Platts had previously stated a minimum five-day range for offers.

### LOADING LOCATIONS

Platts reflects bids, offers and transactions in its Urals assessments using an inclusive process. If for instance, there are

bids or offers stating Novorossiisk as a loading basis, Platts will also consider bids and offers from other ports including Yuzhny and Odessa in the normalization process leading to the CIF Med Urals assessment.

## VOLUME

Platts currently normalizes to 80,000 mt ex-Novorossiisk in its CIF Med Urals assessment. Typical loading sizes may change over time, and Platts may review and if necessary change the cargo sizes reflected in its assessments when this occurs. In such cases, Platts will advise the industry accordingly.

## SHIP ACCEPTABILITY

If unnamed vessel is sold and qualifies for assessment then seller must meet vetting of buyer. The seller is entitled to substitute later vessel meeting same vetting.

If seller offers with named vessel, then buyer can buy subject to vetting approval and if rejected then deal is not finalized. For assessment purposes, editors will review quality of vessel to determine if it should be considered in the assessment process.

## GRADES

- **Urals Med (CIF Augusta):** This daily spot price assessment takes into account cargoes loading from typical Black Sea ports with the assessment reflecting normalization to the quality coming out of Novorossiisk. The most significant volumes come out of Novorossiisk, Odessa and Yuzhny, though in the past Urals has been exported out of Theodosia, Kavkaz and Kerch, for delivery into the Mediterranean. The assessment basis is CIF Augusta, Sicily/Italy. Cargoes delivered to other ports in the Mediterranean can also be considered, with freight costs taken into account. Cargoes for delivery within the Black Sea are not considered. Cargoes of approximately 80-140,000mt are used for the assessment. The typical pricing period for cargoes is either three days after bill of lading or five days after bill of lading. Cargoes pricing on a different basis can be included in the assessment after an adjustment. Gravity is approximately 31-33 degrees although currently qualities typically have been towards the heavier end of the scale, with a sulfur content of 1.3%. The current bbl/mt conversion factor for Urals crude oil is 7.240-7.329.
- **Urals "Recombined" (RCMB) CIF Augusta:** This daily spot price is an outright price for Urals CIF Augusta and does not take into account backwardation or contango. This price is produced by adding or subtracting the prevailing market differential for CIF August Urals against the daily

Dated Brent assessment. No further adjustments are made. This assessment is published as an outright price only. The differential is assessed according to the methodology in the paragraph above. This quotation for Urals CIF Augusta Recombined was first published March 1, 2003.

- **Urals ex-Novorossiisk (FOB):** This daily spot assessment takes into account cargoes traded FOB at the Black Sea port of Novorossiisk. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Delivered prices may be used in the assessment once adjusted for freight costs. In periods of spot market illiquidity in both the delivered and the FOB markets, Platts typically uses freight rates of a 135,000mt-loader (standard 1-mil bbl ship) to provide a guide for the FOB level, using Platts spot freight assessments in Dirty Tankerwire report, as well as the relevant days of delays and demurrage cost for the Turkish straits, which are also published in the Dirty Tankerwire. Gravity is approximately 31-33 degrees although currently qualities typically have been towards the heavier end of the scale, with a sulfur content of 1.3%. The current bbl/mt conversion factor for Urals crude oil is 7.240-7.329. The assessment is published as a high and a low.
- **Urals ex-Novo (FOB) 80 kt:** This daily spot assessment takes into account cargoes traded FOB at the Black Sea port of Novorossiisk. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Delivered prices may be used in the assessment once adjusted for freight costs. In periods of spot market illiquidity in both the delivered and the FOB markets, Platts uses freight rates of an 80,000mt-loader (standard 600,000 bbl ship) to provide a guide for the FOB level, using Platts spot freight assessments in Dirty Tankerwire report, as well as the relevant days of delays and demurrage cost for the Turkish straits, which are also published in the Dirty Tankerwire. Gravity is approximately 31-33 degrees although currently qualities typically have been towards the heavier end of the scale, with a sulfur content of 1.3%. The current bbl/mt conversion factor for Urals crude oil is 7.240-7.329. The assessment is published as a high and a low.
- **Urals ex-Baltic Sea/Urals R'dam (CIF Rotterdam):** This daily spot assessment takes into account cargoes loading from Baltic Sea ports of Butinge, Russia's Primorsk and Poland's Gdansk. Cargoes loading in Russia's Barents Sea port of Murmansk are also taken into account. The assessment basis is CIF Rotterdam/Netherlands. Typically 100,000 mt cargoes are taken into account. Cargoes delivered into other ports in North-West Europe can be considered with freight costs taken into account. The

typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Gravity is approximately 31-33 degrees although currently qualities typically have been towards the heavier end of the scale, with a sulfur content of 1.3%. The current bbl/mt conversion factor for Urals crude oil is 7.240-7.329. The assessment is expressed as a high and a low.

- **Urals ex-Baltic Sea (FOB):** Effective December 16, 2002 Platts widened the range of Baltic sea load ports reflected in its FOB assessment in the north to include Ventpils, Butinge and Tallinn. Despite a sharp increase of the number of cargoes loading from Primorsk, the steep climb of Worldscale rates in the winter season for cargoes loading from Primorsk has necessitated the exclusion of Primorsk in this context. Typical daily assessment is based on the 100kt cargo size. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Delivered prices may be used in the assessment once adjusted for freight costs. Gravity is approximately 31-33 degrees although currently qualities typically have been towards the heavier end of the scale, with a sulfur content of 1.3%. The current bbl/mt conversion factor for Urals crude oil is 7.240-7.329. The assessment is published as a high and a low.
- **Urals ex-Primorsk (FOB):** Effective January 15, 2007 Platts is publishing a FOB assessment in Northwest Europe for cargoes loading Urals from the Russian Baltic port of Primorsk. The typical daily spot assessment is based on the 100kt cargo size. The assessment reflects the Urals CIF Rotterdam adjusted for freight rates on the day. In winter, the ice class premium will be included in the assessment when shipowners add those premiums to their freight rates. Gravity for Urals is approximately 31-33 degrees with a sulfur content of 1.3%. The current bbl/mt conversion factor is 7.284. The assessment is published as a high and a low.
- **Kirkuk ex-Ceyhan (FOB):** This daily spot assessment takes into account Iraqi Kirkuk crude loading at Ceyhan in Turkey. Prices are assessed on an FOB basis. The typical cargo size is 140,000mt, but both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. In periods of spot market illiquidity, Kirkuk is valued as a differential or occasionally a premium to Mediterranean sour crude benchmark Urals CIF Augusta, netbacked from Augusta to Ceyhan using the freight rates for the 135,000mt cargo size as published in Platts Dirty Tankerwire. The API gravity for Kirkuk is 35-36 degrees and the sulfur content is 2.0%. The bbl/mt conversion factor is 7.418-7.463.
- **Es Sider (FOB Es Sider):** This daily spot assessment takes

into account cargoes loading from the Libyan port of Es Sider for delivery into the Mediterranean. In periods of spot market illiquidity, Es Sider is valued as a premium to Mediterranean sour crude benchmark Urals CIF Augusta, netbacked from Augusta to Es Sider using the freight rates for the 80,000mt cargo size as published in Platts Dirty Tankerwire. This Libyan crude has an API gravity of 36-37 degrees and a sulfur content of 0.40-0.42%. The bbl/mt conversion factor is 7.463-7.507. The assessment is published as a high and a low.

- **Iran Heavy (FOB Sidi Kerir):** This daily spot assessment takes into account cargoes loading from the Egyptian port of Sidi Kerir for delivery into the Mediterranean. Since Mar 15, 2001, in the absence of any spot market information, Platts has assessed Iranian crudes in relation to their Official Selling Prices (OSPs). Iranian OSPs, set monthly by the National Iranian Oil Company, NIOC, are related to the IPE's Brent weighted average (BWAVE) and Platts uses dated to frontline (DFL) swaps in order to obtain a conversion value between BWAVE and Dated Brent. The API is 31-32 and the sulfur content is 1.8%. The bbl/mt conversion factor is 7.240-7.284.
- **Iran Light (FOB Sidi Kerir):** This daily spot assessment is daily and takes into account cargoes loading from the Egyptian port of Sidi Kerir for delivery into the Mediterranean. Since Mar 15, 2001, in the absence of any spot market information, Platts has assessed Iranian crudes in relation to their Official Selling Prices (OSPs). Iranian OSPs, set monthly by the National Iranian Oil Company, NIOC, are related to the IPE's Brent weighted average (BWAVE) and Platts uses dated to frontline (DFL) swaps in order to obtain a conversion value between BWAVE and dated Brent. The API is 33.5-34.0 and the sulfur content is 1.4%. The bbl/mt conversion factor is 7.351-7.374.
- **Suez Blend (FOB Ras Sukheir):** The spot assessment of this Egyptian crude is made on a daily basis. Spot cargoes of Suez Blend may be sold Brent-related FOB Ras Sukheir. The API is 32-33 degrees and the sulfur content is 1.7%. In periods of spot market illiquidity the price assessment for Suez Blend will be valued as a differential to Mediterranean sour crude benchmark Urals CIF Med, taking into account the freight and quality difference between the two crudes. The bbl/mt conversion factor is 7.284-7.329.
- **Siberian Light (CIF Augusta):** This daily spot assessment takes into account cargoes loading from Black Sea ports for delivery into the Mediterranean. The assessment basis is CIF Augusta, Sicily/Italy. Both small and large cargoes are used for the assessment (approximately 50-140,000mt). Cargoes delivered to other ports in the Mediterranean can also be considered, with freight costs taken into account. Cargoes for delivery within the Black Sea are not taken into account, but may be considered as a guide in periods of spot market illiquidity. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with

the pricing period taken into account. The API gravity for Siberian Light is 35-36 degrees and the sulfur content is 0.6%. The bbl/mt conversion factor is 7.418-7.463.

- **CPC Blend (CIF Augusta):** This daily spot assessment takes into account cargoes loading from Black Sea port CPC Terminal for delivery into the Mediterranean. The assessment basis is CIF Augusta, Sicily/Italy. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). Cargoes delivered to other ports in the Mediterranean can also be considered with freight costs taken into account. Cargoes for delivery within the Black Sea are not taken into account. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. The API gravity for CPC Blend is 43.5 degrees and the sulfur content is approximately 0.5-0.6%. The bbl/mt conversion factor is 7.8.
  - **CPC Blend FOB (CPC Terminal):** This daily spot assessment takes into account cargoes loading from the CPC terminal on the Black Sea. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Platts typically uses freight rates of a 135,000mt cargo (standard Suezmax) to provide a guide for the FOB level, using Platts spot freight assessments in the Dirty Tankerwire. After the introduction of the so-called "Bosporus clause" in November, 2002, restricting passage for crude oil tankers to the day hours and thereby creating occasional waiting time at the Bosporus and Dardanellas Straits, the estimated demurrage is taken into consideration. The port charges applicable to Novorossiisk are deducted.
  - **CPC Blend FOB (CPC Terminal) 80kt:** This daily spot assessment takes into account cargoes loading from the CPC terminal on the Black Sea. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Platts typically uses freight rates of a 80,000mt cargo (standard Aframax) to provide a guide for the FOB level, using Platts spot freight assessments in the Dirty Tankerwire. After the introduction of the so-called "Bosporus clause" in November, 2002, restricting passage for crude oil tankers to the day hours and thereby creating occasional waiting time at the Bosporus and Dardanellas Straits, the estimated demurrage is taken into consideration. The port charges applicable to Novorossiisk are deducted.
  - **Azeri Light (CIF Augusta):** This daily spot assessment takes into account cargoes of Azeri Light sold from Black Sea ports into the Mediterranean on a CIF Augusta basis.
- Cargoes delivered to other ports in the Mediterranean will also be considered with freight costs taken into account. Cargoes for delivery within the Black Sea are not taken into account. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. The API for Azeri Light is 34-34.5 degrees and the sulfur content is 0.143-0.15%, though gravity has been observed to be higher recently. The bbl/mt conversion factor is 7.374-7.395. The assessment is expressed as a high and a low.
- **Azeri Light FOB Supsa:** This daily spot assessment takes into account cargoes loading from the Black Sea port of Supsa. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. Delivered prices may be used in the assessment once adjusted for freight costs. In periods of spot market illiquidity in both the delivered and the FOB markets, Platts typically uses freight rates of a 135,000mt cargo (standard Suezmax) to provide a guide for the FOB level, using Platts spot freight assessments in the Dirty Tankerwire report. After the introduction of the so-called "Bosporus clause" in November, 2002, restricting passage for crude oil tankers to the day hours and thereby creating occasional waiting time at the Bosporus and Dardanellas Straits, the estimated demurrage is taken into consideration. The applicable port charges for Novorossiisk are deducted. The assessment was first published August 1, 2003. The API for Azeri Light is 34-34.5 degrees and the sulfur content is 0.143-0.15%, though gravity has been observed to be higher recently. The bbl/mt conversion factor is 7.374-7.395. The assessment is expressed as a high and a low.
  - **BTC (Azeri) crude FOB Ceyhan basis:** This daily spot assessment was introduced on June 1, 2006 and reflects typical export grade from the BTC pipeline at Ceyhan. Typical export grade currently reflects Azeri Light crude. The typical volume is seen at 80,000 mt but export volumes may change depending on market conditions. Assessments are based on spot trading activity for cargoes loading 10-30 days ahead of date of publication.
  - **Saharan Blend (FOB):** This daily spot assessment takes into account cargoes loading from Algerian ports Skikda and Arzew. Prices are assessed on an FOB basis. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. The API gravity for Saharan Blend is 45-46 degrees and the sulfur content is 0.1%. The bbl/mt conversion factor is 7.864-7.909.
  - **Syrian Light:** This daily spot assessment takes into account cargoes loading from Baniyas in Syria. Prices are assessed on an FOB basis. Both small and large cargoes are used for the

assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. . In April 2003, Syria cut exports by approximately 40 percent, which has made the market less liquid. So in periods of spot market illiquidity the price assessment for Syrian Light will be valued as a differential to Mediterranean sour crude benchmark, Urals CIF Med, taking into account the quality difference between the two crudes. As of February 2002 Syria's state oil company Sytrol changed the API baseline from 35.70-36.30 to 37.40- 38.0 degrees, with sulfur content of 0.8%. The bbl/mt conversion factor is 7.525-7.552.

- **Syrian Heavy (Souedie):** This daily spot assessment takes into account cargoes loading from Tartous in Syria. Prices are assessed on an FOB basis. Both small and large cargoes are used for the assessment (approximately 80-140,000mt). The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. In April 2003, Syria cut exports by approximately 40 percent, which has made the market less liquid. So in periods of spot market illiquidity the price assessment for Syrian Heavy will be valued as a differential to Mediterranean sour crude benchmark, Urals CIF Med, taking into account the quality difference between the two crudes. The API gravity for Souedie is 23-24 degrees and the sulfur content is 4.2%. The bbl/mt conversion factor is 6.883-6.927.
- **Zarzaitine:** This daily spot assessment takes into account cargoes loading from La Skhirra in Tunisia, though the origin of the crude itself is Algerian. Prices are assessed on an FOB basis. Both small and large cargoes are used for the assessment (approximately 60-140,000mt). The pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. In periods of spot market illiquidity the price assessment for Zarzaitine will be valued as a premium to Algeria's Saharan Blend, taking into account the quality difference between the two crudes. The API gravity for this grade is 42-43 degrees and the sulfur content is 0.1%. The bbl/mt conversion factor is 7.730-7.775.
- **Kumkol:** This daily spot assessment takes into account cargoes of Kumkol delivered into the Mediterranean on a CIF Augusta basis. Both small and large cargoes are taken into account (approximately 30-100,000 mt). Cargoes delivered to other ports in the Mediterranean will also be considered with freight costs taken into account. Cargoes for delivery within the Black Sea are not typically taken into account, but may be considered as a guide in periods of spot market illiquidity. The typical pricing period for cargoes is either three or five days after bill of lading. Cargoes pricing on a different basis can be included with the pricing period taken into account. The API is 40-41

degrees and the sulfur content is 0.1-0.2%. The bbl/mt conversion factor is 7.641-7.686.

## PERSIAN GULF

### DUBAI AND OMAN

Dubai and Oman assessments, as well as all other Platts daily Persian Gulf crude assessments, are established following the completion of a half-hour pricing window conducted out of Singapore between 4 p.m. and 4:30 p.m. local Singapore time. For a discussion document of how Platts assesses markets in a half-hour Market on Close window, please see the section in this document entitled Market on Close.

Platts assesses physical Dubai and Oman for three forward months. For instance, in April, Platts will assess June, July and August liftings for both Dubai and Oman. In May, Platts assessed July, August and September Dubai and Oman. The rollover of the assessment coverage occurs on the first working day of the month. For example, Platts would assess June Dubai and Oman on April 30, but would roll the coverage of Dubai and Oman from June to July on May 1. (Please see details of partials convergence further down)

Oman and Upper Zakum can be nominated for delivery against Dubai on physical convergence ie, on the completion of 19 partials of 25,000 bbl with a single counterparty): Platts Dubai assessments reflect market activity in which the Dubai buyer will accept alternative delivery of an Upper Zakum or Oman cargo. Hence, the activity of any Dubai market player will be taken into account only if such trader is willing to accept an Upper Zakum or Oman cargo delivery in lieu of Dubai. The activity of any Dubai/Oman seller will be taken into account only if the seller is willing to declare the grade (Dubai or Upper Zakum or Oman) to be lifted by the buyer. Such declaration of grade must be made at the point of executing the transaction (on physical convergence).

**Size:** Dubai/Oman assessments reflect 25,000 bbl parcels. Spot premiums for 500,000 bbl cargoes may be considered or factored into the assessment, particularly in the event of a wide bid/offer range.

**Oman specifications:** Platts will evaluate all market relevant data to arrive at its Oman assessments. Oman may trade at a differential versus Dubai or more commonly versus its official selling price set by the Ministry of Oil and Gas (MOG). Platts assesses spot Oman two months forward. For example, during March, Oman loading in May will be assessed through March 31. On April 1, Oman loading in June will be assessed. The spot price differential versus the MOG official price and its relationship to Dubai may be taken into account to determine the spot price of Oman. Oman can be assessed by tracking Brent/Oman spreads, MOG swaps plus the spot MOG premium

or discount. The API gravity is 33.0 degrees and the sulfur content is 1.14%.

The assessment for Oman MOG represents a differential to Oman's retroactive monthly official selling price. Cargoes will sell on a differential to the expected assessment two to three months before the price is actually released. Platts' Oman MOG assessment represents the differential as quoted in the spot market. Deals may take place MOG-related (Ministry of Oil & Gas official selling price), fixed price, or related to any other basis. All these deals will be related to a fixed price equivalent. Oman's value reflects the market on close value at 1630 Singapore local time or 0830 GMT.

Example: In trade on March 1, the front-month spot Oman trading month was for barrels loading in May. Spot Oman was trading at around flat to the May MOG official selling price. The spot fixed price front-month Oman assessment is derived as follows: MAY DUBAI SWAPS + MAY MOG/DUBAI SWAPS SPREAD + MAY SPOT MOG DIFFERENTIAL

**MOG/Dubai spread:** The MOG/Dubai spread is a derivative instrument and is settled by measuring the differential between Oman's official selling price and Dubai for the month concerned. This spread is traded in the "over-the-counter" market and has no physical delivery.

**Derivatives/swaps:** Platts assesses three forward months for Dubai swaps. The swaps price out on the Platts Dubai front-month cash assessments. Dubai swaps typically trade on a monthly calendar basis, but unlike physical assessments, the swaps are assessed from one month forward. In January, for example, the first month swap assessed is February, followed by March and April. The rollover date for the Dubai swaps is the 1st of every calendar month. These swaps are used for hedging and speculative purposes. The Dubai swaps contract has no physical delivery. The Dubai swap typically prices out against Platts Dubai assessments.

## DUBAI/OMAN PARTIALS ASSESSMENT METHODOLOGY

**Trading volumes assessed:** Platts assessments for Dubai and Oman will be based on a minimum of 25,000 bbl partial cargo bid/offered or traded, with the market price derived from increments of 25,000 bbl. The value of 25,000 bbl parcels will take precedence over larger parcel sizes in the assessment process. In addition, a trader bid/offering, for example, 100,000 bbl must be willing to trade in 25,000 bbl clips with any counterparty.

**Trading periods assessed:** Platts will continue to assess Dubai and Oman two months forward from date of publication, with the roll-over date for assessment on the first working day of each calendar month. For example, the last day that July 2009 Dubai and Oman partials will be taken into consideration for the July assessment will be May 31. Assessments are made at the close of the Singapore day at 1630 local time (0830 GMT).

**Cash settlement:** Any position amounting to less than 475,000 bbl by the calendar month's end is understood to be cash settled, unless both counterparties mutually agree to deliver/take delivery of a smaller top-up cargo. Partial contracts will be settled based on Platts assessments published on the last working day of each calendar month.

**Convergence of partials to a full cargo:** Once a principal acquires nineteen 25,000 bbl parcels of the same grade (Dubai or Oman) from a single seller within the calendar month, the partials automatically converge into a physical cargo of 475,000 bbl. This is equivalent to a full cargo of 500,000 bbl with commercial tolerance of minus 5%. Neither the seller nor the buyer has the right to deny delivery or to refuse lifting. However, both parties may mutually agree to book out of the contract on the basis of the Dubai or Oman assessment published on the last working day of the calendar month.

**Pricing of terminal operational tolerance:** The deviation of up to 1,000 bbl in operational tolerance, which is subject to terminal performance for cargoes delivered FOB Fateh terminal, Dubai will be priced on Dubai assessments published on the last working day of each calendar month. For example, the operational tolerance for cargoes loading in July will be priced off the assessment of May 31. The deviation of up to 1,000 bbl in operational tolerance for cargoes delivered FOB Mina Al Fahal terminal, Oman will be priced on Oman assessments published on the last working day of each calendar month.

**Optionality of Oman delivery:** Platts Dubai assessments reflect market activity in which the Dubai buyer will accept alternative delivery of an Upper Zakum or Oman cargo. The seller must declare the grade (Dubai, Upper Zakum or Oman) at the point physical convergence.

**Terms and conditions:** Terms and conditions must be declared at seller's option upon transaction of the nineteenth partial. Only Oman's MOG GT&C or Shell's General Terms and Conditions (GT&C) may be declared for Oman cargoes, as is standard practice in the physical cargo market. ConocoPhillips' GT&C are required for Dubai cargoes. Any of these terms and conditions, however, should not allow for further optionality over cargo size. A physical cargo created by nineteen partial cargoes would be 475,000 bbl min/max (excluding 1,000 bbl in operational tolerance).

**Loading date nominations:** Buyers should nominate loading dates for Dubai or Oman cargoes prior to the last three days of the calendar month of trading, unless both parties mutually agree otherwise. This is to avoid B/L slippage (the risk that end-month loading dates of a cargo will spill over into the next month with different pricing implications.) Dubai and Oman partials contracts leading to a full cargo delivery should contain an assurance of delivery for the month originally specified. Buyers of nineteen partials retain the flexibility to negotiate with a seller for differing volumes for loading in part-cargoes, or to request a book-out of some or the entire volume, subject to mutual agreement.

**Trading counterparties:** Affiliates or closely-related trading parties will be deemed part of the same parent company for partials trading considerations. Platts will apply its editorial judgment to determine whether a transaction is suitably arms-length. If subsidiaries/offshore entities of parent company "A" trade with company "B", those partials will be added and considered as part of the total partials trading position of parent company "A".

**Price assessment:** To arrive at its Dubai and Oman assessments, Platts will take into account fixed-price bid/offers for partial and full cargoes where applicable; inter-month Dubai or Oman spreads; Dubai or Oman swaps; MOG/Dubai spreads (differentials to the retroactive monthly official selling price set by Oman's Ministry of Oil and Gas); spot Dubai and MOG premia/discounts; EFPs or spreads to crude grades such as Brent; and spreads to published benchmarks. In the event of a wide bid/offer spread, Platts will not average the bid and offer. Platts will evaluate market conditions and establish an assessment that in its editorial judgment reflects the transactable level of Dubai and Oman. Unusually high or low price deals will be scrutinized by Platts to discern whether the deal is fit for assessment purposes.

In the event of partials trading activity in the market for Upper Zakum, the same terms and conditions will apply as for Dubai and Oman. Dubai cannot be nominated against Upper Zakum.

**Editorial guidelines for assessments of partials in the Singapore Market on Close assessment process:**

Platts assessments take into consideration bids and offers made up to no later than 16:00:00:59 hours Singapore time (08:00:00:59 GMT). Bids and offers with unusual terms and conditions will typically not be taken into account. Platts should be informed prior to the assessment window of any counterparty with which a principal cannot trade for financial or legal reasons. Bids and offers made by counterparties unable to trade with each other may cross, allowing other traders to arbitrage the difference. Platts should be informed by the principal prior to the assessment window if a broking house is submitting a bid or offer on the principal's behalf. Representative broking houses will have similar execution responsibilities and bear similar exposures as their principals for non-performance of trading instruments, whether cash settled or physically delivered.

Platts will take into account changes in price, but not changes to volume/date/terms & conditions, made to bids and offers up to 16:29 hours Singapore time (08:29 GMT). Platts assessment guidelines governing the incrementability of price changes for bids and offers, and the repeatability of deals, will continue to apply as for all market-on-close assessments (see <www.platts.com>oil>specifications> for more details on MOC methodology). Platts does not take into consideration deals done between company affiliates or between companies with close working trading relationships.

Platts will typically consider for assessment purposes bids and offers that are firm until 16:30:00:59 hours Singapore time

(08:30:00:59 GMT) and that are executable by any creditworthy counterparty. Participants can withdraw their bid/offer at any time, provided no prior interest has been expressed for this bid or offer. Any such intention to execute expressed to the counterparty or to Platts before 1630 hours would be seen as a valid intention to transact even if the deal was fully finalized after 1630.

**Further Questions:** In Singapore, contact Calvin Lee at calvin\_lee@platts.com, Daniel Booth at daniel\_booth@platts.com, or Paul Young at paul\_young@platts.com, or +65 6530 6517.

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## OTHER PERSIAN GULF CRUDES

Platts publishes spot assessments for other Persian Gulf crudes in addition to Dubai, Upper Zakum and Oman: Murban, Lower Zakum, Umm Shaif, Qatar Land, Qatar Marine, Al-Shaheen and Banoco Arab Medium crudes.

Front-month assessments for the Persian/Arab Gulf grades reflect cargoes loading two calendar months from date of publication. For example, in March, the front-month assessments reflect barrels loading in May. On the first working day of April, the front-month assessments will rollover to reflect barrels loading in June.

The assessments in the Persian/Arab Gulf reflect 500,000 bbl parcels. Spot premiums for partial cargoes may be considered or factored into the assessment concerned. Platts assessments for all Persian/Arab Gulf grades are based on a market on close principle at 1630 Singapore time or 0830 GMT. Platts does not take into consideration transaction between affiliates or between companies with close working trading relationships.

**Murban, Upper Zakum, Lower Zakum and Umm Shaif:** These are crudes from Abu Dhabi of the United Arab Emirates. The four grades typically trade at a differential to Abu Dhabi National Oil Co's official selling price for the month concerned. May loading cargoes would trade at a differential to ADNOC's May OSP, which is calculated as a differential to Dubai. The equation used to arrive at a Murban, Upper Zakum, Lower Zakum or Umm Shaif assessment for May barrels is as follows: May Dubai swaps + Existing Murban OSP/Dubai spread + May spot Murban differentials + expected ADNOC adjustments. In May 2006, a spot market for Upper Zakum started up with ExxonMobil taking a 28% stake in Upper Zakum production and selling non destination restricted cargoes on a term basis. Typically, ADNOC has sold Upper Zakum as destination-restricted cargoes. Destination restricted cargoes cannot be nominated in the event of physical convergence in the partials

market. Platts will monitor future Upper Zakum trading patterns and make any necessary adjustments to methodologies.

**Qatar Land and Qatar Marine:** These crudes typically trade at a differential to Qatar Petroleum's official selling price. Qatar's OSP is announced on a retroactive basis and is based on a differential to Oman's OSP. For example, the June OSP would be published early July. The equation to derive Qatar Land and Qatar Marine's assessment for barrels lifting in May is as follows: May Oman MOG swaps + existing OSP/Oman OSP spread + spot differentials + expected OSP adjustments.

**Banoco (Bahrain National Oil Co) Arab Medium:** This crude comes from Bahrain and is similar in quality to Saudi Arab Medium. Saudi crudes typically do not trade on a spot basis but Banoco Arab Medium can trade spot, priced as a differential to Saudi Aramco's Arabian Medium official selling price. Aramco's OSP is announced one month forward and is based on the average of front-month Dubai/Oman assessments plus a differential. Therefore, the July OSP is announced early June. The equation used to derive Banoco Arab Medium's assessment for barrels loading in May is as follows: Average of May Oman & Dubai swaps + existing OSP differential + spot differentials + expected OSP adjustments.

**Dar Blend:** Platts has been assessing the value of Dar Blend crude oil since February 16, 2009. Sudan's sweet, acidic Dar Blend crude from the Melut basin is exported in cargoes of 600,000 up to 1-million barrels, typically marketed at a differential to Dated Brent by state oil firms Sudapet, China National Petroleum Corp (CNPC) and Malaysia's Petronas. Export volumes of Dar Blend are projected to climb toward 260,000 b/d. Dar Blend has gravity of 26.4 API, a sulphur content of 0.12%, and TAN of 2.4 mgKOH/g. This crude is evaluated at Asian close (0830 GMT) as a fixed price and as a differential to Dated Brent, which is assessed at London close (1630 hours local time).

**Ras Gas condensate & Al Shaheen crude:** Platts has been publishing a daily assessment of Qatar's Ras Gas condensate and Al Shaheen crude since January 3, 2005. Spot assessments reflect barrels loading two calendar months from the date of publication. For example, on January 3, barrels loading in March are assessed. These assessments roll over on the first working day of the month. Spot assessments of Ras Gas and Al Shaheen consist of a fixed-price assessment and an assessment of the spot market differential against Platts' Dubai assessments. Assessments take into consideration Ras Gas traded in typical 500,000 bbl cargoes, and Al Shaheen traded in typical 600,000 bbl cargoes.

**South Pars condensate:** Platts has been publishing a daily assessment of South Pars condensate since February 16, 2009. Iran's South Pars condensate is produced from gas fields and exported from the Persian Gulf port of Assaluyeh. After several new fields come online, production by end-2009 is estimated at around 412,000 b/d. South Pars has gravity of 54.4 API and a sulfur content of 0.22%. South Pars condensate is evaluated at Asian close (0830 GMT) as a fixed price, as a differential to Platts

Middle Eastern crude oil benchmark Dubai, and as a differential to Dated Brent which is assessed at London close (1630 hours local time).

**Qatar LSC condensate:** Platts has been publishing a daily assessment of the value of Qatar Low Sulphur Condensate (LSC) since February 16, 2009. Qatar LSC (previously known as Dolphin condensate) is exported from Ras Laffan port in cargoes of 500,000 barrels, and typically marketed at a differential to Platts Middle Eastern crude oil benchmark Dubai, or as a differential to a basket of Platts FOB AG naphtha, kerosene and gasoil assessments. Four cargoes of Dolphin condensate are typically sold each month by Tasweeq (The Qatar International Petroleum Marketing Co.). Dolphin condensate has gravity of 56.9 API, and a sulphur content of 0.19%. This condensate is assessed at Asian close (0830 GMT) as a fixed price, as a differential to Platts Middle Eastern crude oil benchmark Dubai, and as a differential to Dated Brent which is assessed at London close (1630 hours local time).

## ASIAN DATED BRENT

Platts launched effective October 2, 2008 an Asian Dated Brent (ADB) assessment published on a daily basis, reflecting the value of Dated Brent at Asian market close (0830 GMT). The ADB reflects the price prevailing during the close of market in Asia taking into account the rise or fall in the movement in the cash BFOE instrument, from the time of assessment of Dated Brent at the prior trading day's European market close at 1630 hours London time, until Asian close. This movement is determined by valuation of Brent cash and futures markets by the close in Asia. Dated Brent reflects loading for cargoes 10-21 days from day of publication. The Asian Dated Brent is therefore a dated instrument. The price is underpinned by instruments such as BFOE and futures which are cyclical in nature and therefore roll either at the end of the calendar month for BFOE or mid month for futures.

## ASIAN DATED BRENT STRIP AND DIFFERENTIALS

Published differentials to Dated Brent for Asia Pacific grades are measured against the underlying Dated Brent price for the corresponding month, or the Asian Dated Brent Strip. The underlying Dated Brent is calculated using the Brent Frontline Swap (PGA 611) minus the Brent Dated to Frontline Swaps, or DFL (PGA 606).

Please refer to the Platts Forward Curve (PFC) methodology for details of the DFL market, which can be found at:

<http://www.mhenergy.com/Oil/Resources/Methodology%20&%20Specifications/pfc.pdf?S=n>

In line with the Asian Dated Brent (ADB) assessment, the price will be time adjusted to reflect 1630 hours Singapore time. This

methodology for calculating differentials against Brent is effective from August 10, 2009. Prior to this date, the differential was measured against the prevailing Asian Dated Brent.

## ASIA-PACIFIC

Platts implemented several important changes to its Asia-Pacific crude oil assessment Methodologies on July 9, 2005. From this date, Platts considers partial cargo trades of 25,000 bbl in its assessment process for Minas and Tapis crude oils. At the same time, Platts changed the assessment period for all of its regional crude oil assessments to a monthly basis, two months ahead, with a roll-over date of on the 9th day of the month, or the first business day after. For example, on June 8, Platts would assess cargoes loading in July, but on June 9, the assessments would roll to crude loading in August. The specific crudes covered crudes affected by this change are: Tapis, Minas, Labuan, Miri, Gippsland, Daqing, Shengli, Griffin, Cossack, Kutubu, Nanhai, Bach Ho, Nile Blend, Ardjuna, Handil Mix, Senipah, NW Shelf, Cinta, Duri, Widuri and Belilda. For paper Tapis, the rollover date is the first day of the month.

Assessments also consider bids/offers, and differentials to other actively traded crudes, related paper markets and, in the case of Indonesian crudes, official crude prices (ICPs). Crude markets are assessed at 1630 Singapore time. The following are details of the specifications for the crudes reported including loading ports. Sulfur content and API gravity may vary over time.

**Methodology:** Platts assesses crude grades on a fixed price basis, and also where appropriate, the spread to the crude grades' respective benchmarks. Most trade in the Asia Pacific region is conducted on a floating rather than fixed price basis. The fixed price assessment reflects the equivalent in fixed price terms of a floating price transaction. Platts will determine the relevant benchmark and determine the underlying value of the benchmark for the loading dates. In a typical example, a Tapis physical cargo may trade at a premium of 25 cts/bbl over its own benchmark. Platts will then determine in the swaps market what is the hedgeable level of the benchmark for the pricing dates and add the premium transacted. If the paper market around the bill of lading is \$65.00/bbl then the fixed price equivalent is \$65.25/bbl.

The same approach is used for Indonesian crude grades where they trade in relation to their own ICP, which is only released after the cargo has loaded. However, the fixed price equivalent of the transaction can be determined through the swap market for the ICPs or through values relative to the more liquid crude grades. In a typical example, a Minas cargo loading in April may trade at its own ICP plus 50 cts/bbl. If swap market for April Minas ICPs is at \$65.00/bbl, then the fixed price equivalent of Minas is \$65.50/bbl.

**Spreads versus ICP:** Platts assesses differentials to the Indonesian Contractual Prices (ICPs) for the following crudes: Minas, Attaka,

Ardjuna, Handil, Cinta, Duri, Widuri and Belida. The premium/discounts versus the ICP reflect cargoes loading 2 months forward from the date of publication.

**Spreads versus Tapis:** Platts presently assesses market premiums or discounts for several Asian and Australian crudes against Malaysian Tapis. The premiums/discounts assessed are for the following crudes: Griffin, Cossack, Kutubu and Nanhai. The premium/discounts reflect cargoes loading two months forward from the date of publication. In September 2009, Platts announced plans to discontinue its assessments of all price differentials to published APPI Tapis crude oil values. The final assessments for these differentials will be published on March 31, 2010. The discontinuation affects published APPI-related differentials for Tapis, Griffin, Kikeh, Cossack, Kutubu, and Nanhai Light crude oil grades. Platts also will discontinue assessments of price differentials to APPI Northwest Shelf (NWS) condensate. Finally, Platts will also discontinue assessments of APPI-related swaps and refined product crack spread derivatives. Platts has noted a serious decline in the liquidity of paper swaps trading of Tapis and or NWS, and has observed increasing opacity and volatility in traded cargo differentials to APPI. Platts will continue to publish fixed price assessments and Dated Brent-related differentials for Tapis, Griffin, Kikeh, Cossack,

### Asia-Pacific crudes

Crude	API	Sulfur (%)	Country	Location
Cossack	49	0.04	Australia	North West Australia
Gippsland	48	0.1	Australia	Westernport
Griffin	55	0.03	Australia	Denture, Griffin
North West Shelf	60	0.01	Australia	Dampier
Daqing	32.7	0.1	China	Luda/Dalian in Yellow Sea
Nanhai Light	39.5	0.05	China	Hui Zhou
Shengli	24	0.9	China	Qingdao on Yellow Sea
Ardjuna	35.1	0.13	Indonesia	Ardjuna
Senipah	53.9	0.02	Indonesia	Blanglancang
Attaka	44.7	0.04	Indonesia	Santan, off Balikpapan
Belida	46.2	0.02	Indonesia	Belida
Cinta	32.7	0.11	Indonesia	Cinta
Duri	21.5	0.14	Indonesia	Dumai, Sumatra
Handil	33.8	0.07	Indonesia	Senipah, off Balikpapan
Minas	36	0.08	Indonesia	Dumai, Sumatra
Widuri	33.3	0.07	Indonesia	Widuri
Labuan	31.5	0.08	Malaysia	Labuan Island, off Sabah
Miri	31.9	0.08	Malaysia	Lutong in Sarawak, near Miri
Tapis	46	0.03	Malaysia	Kerteh, off Trengganu
Kutubu	44	0.04	New Guinea	Kumul terminal
Bach Ho	38.6	0.04	Vietnam	Bach Ho terminal

Kutubu, Nanhai Light and NWS grades. Please email comments or questions to [asia\\_crude@platts.com](mailto:asia_crude@platts.com) and [pricegroup@platts.com](mailto:pricegroup@platts.com).

**Northwest Shelf Condensate:** The Northwest Shelf condensate spread is assessed against its own assessment. The spreads (premium or discounts) are assessments based on spot transactions and market information on cargoes and part cargoes loading two months forward from date of publication.

**Sokol crude:** Platts' assessment of Sokol crude oil reflects cargoes loading out of the DeKastri terminal on eastern Russia's Sakhalin island. The value published reflects the value of cargoes loading in the month that falls two months from the date of assessment. So on April 1, Platts would assess cargoes for loading in the month of June. In accordance with typical market practice, the price assessed is a CFR value, for cargoes being delivered to main ports in Japan and South Korea. Cargoes being delivered elsewhere, including eastern China, are included in the assessment process through price normalization. Sokol crude oil is produced at Russia's Sakhalin I oil field, and currently has an API gravity of 39.7 degrees; a sulfur content of 0.18% and a TAN rating of 0.12. The standard cargo size for Sokol is 700,000 barrels. Platts has been assessing Sokol crude oil since April 1, 2008.

**Vityaz Blend:** Platts plans to launch daily assessments of Vityaz Blend crude oil on April 15, 2009. The crude has evolved since the original Vityaz crude started to be blended with condensate in early 2009. Vityaz is produced from the Molikpaq production platform off the northeast of Sakhalin Island in Russia's Far East and sold by Sakhalin Energy in cargoes of up to 750,000 barrels. Medium sweet crude grade Vityaz alone has gravity of 34.4 API and a sulfur content of 0.22%. Production is slated to rise to 150,000 b/d by 2010. Vityaz Blend is to be assessed at the Asian close (0830 GMT) as a fixed price, as a differential to Platts Middle Eastern crude oil benchmark and as a differential to Dated Brent which is assessed at London close (1630 hours local time).

**Kikeh crude:** Platts' has been assessing the value of Kikeh crude oil since July 9, 2008. The assessment reflects cargoes for lifting on a FOB basis from Sabah, Malaysia. The loading dates reflected by the Kikeh assessment follow the typical methodology for Asia Pacific crudes. Cargoes are therefore typically for loading two months ahead, with a roll-over date on the 9th day of the month, or the first business day after. So on July 9, Platts would assess cargoes for loading in September. From August 9, Platts would roll the assessment forward to reflect cargoes for loading in October. Kikeh crude oil is produced at the Kikeh oil field off East Malaysia's state of Sabah, and currently has an API gravity rating of 34.91 degrees; a sulfur content of 0.105% and a Total Acid Number of 0.08. The standard cargo size for Kikeh is 300,000-600,000 barrels.

**Bach Ho & Nile Blend:** Platts has been publishing premium/discount assessments for Vietnam's Bach Ho crude and Sudan's Nile Blend crude since January 3, 2005. The FOB Bach Ho spot differential is a spread to its official selling price while

FOB Nile Blend's spot differential is a spread to ICP Minas. FOB Nile Blend will also have a fixed-price assessment. Both these assessments are for barrels lifting two months forward from date of publication and take into account typical cargo sizes Bach Ho (600,000- 650,000 bbl) and Nile Blend (600,000-650,000 bbl).

**Su Tu Den:** Platts has been assessing the value of Su Tu Den crude oil since February 16, 2009. Vietnam's Su Tu Den (Black Lion) crude is blended with Su Tu Vang (Golden Lion) and exported in cargoes of 450,000 to 600,000 barrels from a floating, production and storage terminal in the South China Sea. Export volumes of Su Tu Den blend are about 130,000 b/d as of end-2008 and will be 140,000 b/d in 2009. Su Tu Den has gravity of 36 API and a sulfur content of 0.04%. This crude is evaluated at Asian close (0830 GMT) as a fixed price, as a differential to Su Tu Den OSP, and as a differential to Dated Brent which is assessed at London close (1630 hours local time).

**Australia Basin:** Platts has been assessing the value of heavy sweet crude grades Enfield, Stybarrow and Vincent, which are all produced from fields in the Australian Basin, since February 16, 2009. These three grades are evaluated at Asian close (0830 GMT) as fixed prices and as differentials to Dated Brent, which is assessed at London close (1630 hours local time). Enfield has gravity of 22 API, a sulfur content of 0.12% and TAN of 0.43 mgKOH/g. Stybarrow has gravity of 22.8 API, a sulfur content of 0.12% and TAN of 0.67 mgKOH/g. Vincent has gravity of 18.3 API, a sulfur content of 0.55% and TAN of 1.53 mgKOH/g.

## THE PLATTS ASIAN CRUDE OIL INDEX

**Basis:** All index elements are based on Platts daily crude oil spot price assessments, in the following proportions: Middle East sour crude represented by Dubai (17%), Oman (17%), Upper Zakum (17%) and Murban (6%); Asia-Pacific sweet crude represented by Tapis (10%), Minas (8%) and Duri (2%); West African sweet crude represented by Bonny Light (5%), Forcados (4%) and Cabinda (3%); as well as Asian Dated Brent (11%). Each crude oil benchmark will be considered for retention or exclusion from the index, on at least an annual basis. For assessment methodology concerning each of these crude oils, see chapter headings in this same document.

**Timing of assessment:** The ACX is assessed at 0830 GMT, equivalent to 4:30 PM local Singapore time. West African crude oil grades, assessed at European market close at 1630 hours London time on the previous trading day, are adjusted to Asian close timing using Platts Asian Dated Brent (ADB) assessment, published from October 2, 2008. The ACX will be available on every Platts Asian publishing day (see [http://www.platts.com/holiday schedule.jsp](http://www.platts.com/holiday%20schedule.jsp)). On scheduled European holidays when Platts does not publish West African assessments, the ACX index will normalize West African assessments from the previous London publishing day using Asian Dated Brent equivalent values on the day of index publication in Asia.

## UNITED STATES

The spot month for all US domestic pipeline barrels changes on the first business day after the 25th of the calendar month except for Alaska North Slope, a US West Coast cargo market, and except for WTI Calendar Delta. It does not roll with the expiration of the front month of light sweet crude on the New York Mercantile Exchange. Rather, it continues for the three trading days in which the just-expired month continues to trade in the cash WTI market.

For US domestic pipeline barrels, the roll-over date coincides with the date US crude oil pipelines require scheduling to be completed for deliveries in the following month. For instance, from Jan 26 through Feb 25, the front-month out for all US domestic pipeline barrels is March.

On Feb 26, the front-month out for all US domestic pipeline barrels switches to April. If the 26th falls on a weekend or holiday, the next business day marks the beginning of the new scheduling month. But if the 25th is a Saturday or Sunday, scheduling is not extended; it closes on the last business day prior to the 25th. This practice also is followed for California pipeline crudes. The roll date for ANS crude is the 1st of the month. In February, the assessment reflects March values. On March 1, the assessment will roll to April barrels.

The minimum volume for US domestic pipeline grades is 25,000 bbl. All US crude oil assessments reflect market-on-close (MOC) values at 3:15 PM Eastern Time (ET). An explanation of the MOC methodology can be found elsewhere in this document. Please check the table of contents (also see related specifications document titled “Americas crude oil specifications guidelines”).

### CONSIDERATION OF FIXED, DIFFERENTIAL EXCHANGE FOR PHYSICAL AND FLOATING PRICE INFORMATION

On May 5, 2009, Platts announced its intention to complete the process of aligning all pricing elements—fixed price, differentials and futures inputs—in its Americas crude oil and products price assessments at exactly 3:15 pm Eastern Time, effective June 1, 2009.

In those markets where commodities trade at differentials to futures, the prevailing futures’ value as assessed by Platts at 3:15 pm ET will be used in the assessment process. [Please click here to read the methodology statement on determining the value of the futures at 3:15 pm ET.](#)

Market participants submitting bids and offers on a differential exchange for physical (EFP) basis to futures during the Platts Americas oil Market on Close assessment process should be explicit in their positions, including month of reference for the EFP.

For any positions submitted as an EFP versus a futures contract (i.e. July +1.00/barrel), Platts will use the prevailing futures value at 3:15 pm ET to calculate the flat price for the assessment. If parties wish to express positions as an EFP to the 2:30 pm ET same-day settlement value of a futures contract (i.e. today’s July settle +1.00/barrel), Platts will accept this information. The usage of a differential in this fashion would naturally result in a fixed price equivalent.

For any floating EFP positions (i.e. EFPs based on an average of forward settlements around lifting/delivery), Platts will use the prevailing futures at 3:15 pm ET to calculate the flat price for the assessment.

Market participants can also express positions on a fixed price basis, and Platts will consider both fixed prices and EFP differential positions in its assessment processes.

### US DOMESTIC GRADES LONDON CLOSE

Platts launched cash WTI, Light Louisiana Sweet and Mars crude assessments with a timestamp of 4:30 pm London time on March 2, 2009. These assessments line up with the close of the Dated Brent assessment process and are an addition to the existing set of assessments published in the US reflecting values at 3:15 pm Eastern Time.

Platts is publishing the prompt month and next forward month for LLS and Mars, and the three most prompt months for WTI in the set of assessments. Platts is publishing an outright price as well as a differential for each of the three crudes — an EFP in the case of cash WTI relative to NYMEX light sweet crude futures, and a differential to same-month cash WTI in the case of Mars and LLS.

The underlying methodology and specifications for London close Mars, LLS, and cash WTI assessments reflect the underlying methodology for the US close cash WTI, Mars and LLS assessments, with the exception of the assessment timestamp.

### AMERICAS CRUDE MARKER (ACM)

Platts launched the Americas Crude Marker (ACM) assessments on March 16, 2009, to reflect tradable sour crude values in the US Gulf Coast. Following a review of the US Gulf Coast pipeline systems, production and ownership of a number of crude streams, Platts concluded that the ACM assessments would be composed of Mars, Southern Green Canyon (SGC), Poseidon and Thunder Horse. These four sour grades are produced offshore US Gulf Coast and are transported via pipeline to US Gulf Coast refineries, where the streams can be delivered readily into an area in Texas/Louisiana with a refining capacity of 6.3 million b/d. The US is currently operating at a rate of about 15 million b/d, implying that the basket of crude could access roughly 42%

of the US actual operating capacity.

The combined production of these streams is roughly 835,000 b/d, as of January 2009. Thunder Horse crude oil is of lower sulfur content than the other grades, but Platts believes that it should be part of the basket and would only play a significant role in times of severe supply distress. This grade acts in a similar manner to the potential check that Ekofisk plays as a component of the Brent-Forties-Oseberg-Ekofisk mechanism (BFOE).

Platts' Americas Crude Marker assessments incorporate the values of those four pipeline sour grades (Mars, Poseidon, SGC, and Thunder Horse), with the assessment reflecting the price of the most competitive grade (i.e. price at the margin). SGC has historically been the most competitive grade, with Mars, Poseidon and Thunder Horse typically trading above SGC on a flat price basis. The methodology enables other grades to operate as relief valves, with those crude oils forming the assessment at times when the most competitive grade is tight or subject to supply constraints. This approach is extremely important, particularly in situations where there could be weather stress in the US Gulf Coast.

As stated, most grades produced, imported, and refined in the US Gulf Coast are medium in API gravity and high in sulfur. The latest assays for the four grades are as follows:

	Sulfur (%)	Gravity (API)
Mars:	2.231	29.18
Thunder Horse:	0.65	33.7
SGC:	2.479	28.40
Poseidon:	1.41	33.17

## AMERICAS CRUDE MARKER METHODOLOGY

The most competitive grade at the margin will under typical circumstances be the grade reflected in the assessment. Under normal market conditions and reflecting current qualities, the most competitive grade has been Southern Green Canyon (SGC). The inclusion of Mars, Poseidon, and Thunder Horse ensures that if there are unusual conditions affecting the price of SGC then the price at the margin for the ACM would be formed by the then most competitive grade. For instance, any supply disruptions offshore Texas (i.e. hurricane, field maintenance) that could potentially lift the price and disconnect the price of the most competitive grade above the rest of the ACM basket would be held in check by the lowest of the remaining four grades. This would relieve the problem that has been evident with WTI where, for example, it was observed that WTI soared above competing and better grades in September 2008, with no mechanism in place to ensure that the price would be representative of broader US trading and refining economics.

This relief valve concept is a critical component of pricing as it prevents unusual conditions from creating a distorting impact on broader economics in the US Gulf Coast. For example, SGC

traded at a premium to Mars in September 2006 on declining production volumes, which were attributed to field maintenance and supply from SGC-producing fields delivering into the Poseidon blend pool via the Caesar Pipeline's link to the Poseidon pipeline. As heavier crude was diverted into the Poseidon pool at this time, the quality for SGC improved, also supporting the grade's value relative to other US pipeline sour crudes. Had the ACM assessment mechanism been in place at that time, the ACM assessment would have been set by Mars rather than SGC.

Note that the assessment is formed by the most competitive grade. Platts does not average the price of Mars, Poseidon, Thunder Horse, and SGC to set its Americas Crude Marker assessment. Platts independently assesses the value of all four crudes, and the most competitive grade at the margin will be the primary element in the price formation of the assessment.

Three grades in the ACM basket – Mars, Poseidon, and Thunder Horse, are produced offshore Louisiana and arrive onshore via pipeline. Mars and Thunder Horse are delivered into Clovelly, Louisiana. Poseidon is delivered into Houma, Louisiana. SGC is produced offshore Texas, and arrives onshore via pipeline at Nederland, Texas. The diversity of the producing locations in the ACM prevents local supply disruptions from distorting the price of the ACM. At the same time, the majority of US Gulf Coast refiners have access to all four of the grades either via pipeline (Mars, Poseidon, SGC and Thunder Horse) or via barge (SGC to Louisiana). The likelihood of weather conditions such as a hurricane impacting or simultaneously shutting down for an extensive period of time all the platforms and all the pipelines appears remote.

**Assessment Time:** Platts ACM assessments, like all US crude oil assessments, reflect market-on-close (MOC) values at 3:15 PM Eastern Time (ET)

**Timing:** The timing structure for the ACM mirrors the US domestic pipeline market, and Platts publishes three months of the ACM – first, second, and third month. The spot month for all US domestic pipeline barrels changes on the first business day after the 25th of the calendar month. Note that ACM does not roll with the expiration of the front month of light sweet crude on the New York Mercantile Exchange. ACM is a physical assessment and therefore rolls in line with the physical pipeline calendar.

For example, starting March 16, Platts will publish the ACM for April, May and June. On March 26, Platts will roll the ACM along with the rest of the US domestic market to May as the prompt month.

**Basis and Location:** The basis for the ACM is comprised of the basis and location for the four grades:

- **Mars:** The assessment reflects barrels for delivery into Clovelly, Louisiana.
- **Poseidon:** The assessment is for barrels delivered to

Houma, Louisiana.

- **SGC:** The assessment is for barrels delivered into Nederland, Texas.
- **Thunder Horse:** The assessment is for barrels delivered to Clovelly, Louisiana.

**Volume:** The minimum volume for ACM basket grades (Mars, Poseidon, SGC, and Thunder Horse) is 25,000 bbl, the same minimum for all US domestic grades.

**Quality:** The API and sulfur content for Mars, Poseidon, SGC, and Thunder Horse changes on a monthly basis. These changes will be reported in the relevant publication on a retroactive basis. (see above chart for latest assays on the four crudes).

**Participation in Market on Close Assessment Process:** Any credible market participant willing to participate in the ACM assessment process could submit information at any time during the day and/or request publication of transparent bids and offers in Platts' US crude oil market assessment processes for any of the four grades that comprise the ACM.

Platts will consider bids and offers expressed as flat price or as a differential to an underlying basis in its assessment process for ACM. Any market information reported to Platts on a differential basis will be normalized to a fixed price basis for use in the ACM assessment process. Note that the ACM assessment will be published on a fixed and flat price basis.

## AMERICAS DATED BRENT

Platts launched March 2, 2009 an Americas Dated Brent (AMDB) assessment published on a daily basis, reflecting the value of Dated Brent at Americas market close at 3:15 pm Eastern Time. The AMDB reflects the price prevailing during the close of market in the Americas taking into account the rise or fall in the movement in the cash BFOE instrument, from the time of assessment of Dated Brent at the European market close at 1630 hours London time, until the Americas close. This movement is determined by valuation of Brent cash and futures markets by the close in the Americas at 3:15 pm ET. Dated Brent reflects loading for cargoes 10-21 days from day of publication. The Americas Dated Brent is therefore a dated instrument. The price is underpinned by instruments such as BFOE and futures which are cyclical in nature and therefore roll either at the end of the calendar month for BFOE or mid month for futures.

## GRADES

**West Texas Intermediate (WTI):** Platts has two separate WTI assessments: one at Cushing, Oklahoma, and the other at Midland, Texas. Platts assesses three months of WTI-Cushing barrels; Cushing assessments note the delivery month, such as

WTI (Dec). Midland prices are noted as WTI (Mid). The delivery month assessed for WTI-Midland is the same as the first month assessed for WTI- Cushing. API gravity is typically 38-40 degrees with sulfur content approximately 0.3%.

**Mars:** Platts assesses Mars quotes based on the market-on-close methodology, reflecting the value of the grade at 3:15 PM ET, taking into account information received/observed during the day including Platts 30-minute assessment process. The assessment reflects barrels for delivery into Clovelly, Louisiana, for three months forward. API gravity is 30 and sulfur content is 1.83%. The minimum trading volume recognized for assessment purposes is 25,000 bbl. Both flat-priced and differential-based positions are considered for assessment purposes, as the latter can be converted into a fixed and flat price equivalent.

**P-Plus WTI:** The assessment reflects the price of WTI sold into Cushing on the basis of "postings plus." P-plus deals are invoiced at a later date on the basis of a differential to an average of one or more crude oil postings. For example, a deal done at P-plus 75 cts would be invoiced at 75 cts more than the previously agreed-upon postings basis.

**WTI Calendar Delta:** The assessment reflects the price of WTI crude oil sold into Cushing/Oklahoma on the basis of a delta versus a monthly WTI average. WTI Calendar Delta deals are invoiced at a later date: For instance, March WTI calendar delta transactions would be based on the average of the NYMEX WTI front-month during March, plus or minus a delta, and then versus cash front-month WTI after the NYMEX WTI front-month expiry. The delta fluctuates with first/second and first/third month WTI spreads, and with bids/offers in the market. The Platts WTI Calendar Delta assessment reflects where the delta is traded and/or talked in the market. The WTI calendar delta rolls to the next month after the 25th of the month, like other pipeline grades.

Effective May 26, 2006, Platts began considering market activity for its WTI P-Plus crude oil spot price assessment that is based on any of the following standard company WTI crude oil postings: Plains, Sunoco, Shell, Murphy and ConocoPhillips. In addition, Platts will consider transactions based on the Platts P-5 WTI postings index which incorporates postings data from Plains, Sunoco, Shell, Murphy and ConocoPhillips. Previously, WTI P-Plus deals were based on Koch WTI crude oil postings, but Koch announced recently that the respective posting will be discontinued effective July 1, 2006.

**West Texas Sour (WTS):** The assessment is for barrels delivered to Midland, Texas, with an API gravity of 32.8 degrees and a sulfur content of 1.98%.

**Light Louisiana Sweet (LLS):** The assessment is for barrels delivered to St. James, Louisiana. API gravity is 34-41 and sulfur content is 0.4%.

**Heavy Louisiana Sweet (HLS):** The assessment is for barrels delivered to Empire, Louisiana. API gravity is 32-33 and sulfur content is 0.3%.

**Eugene Island:** The assessment is for barrels delivered to St. James, Louisiana. The API gravity is 34-36 and the sulfur content is 0.90-1.20%.

**Southern Green Canyon:** The assessment is for barrels delivered into Nederland, Texas. The API is 30.2 API and gravity at 2.3%. (Southern Green Canyon's API & sulfur content changes on a monthly basis. These changes will be reported in the relevant publication on a retroactive basis).

**Wyoming Sweet:** The assessment is for barrels delivered to Guernsey, Wyoming, with an API gravity of 32 and a sulfur content of 0.9%.

**Bonito:** The assessment is for barrels delivered to St James, Louisiana. API gravity is 35-37 and sulfur content is 0.7-0.9%.

**Mars:** The assessment is for barrels delivered to Clovelly, Louisiana. API gravity is 30 and sulfur content is 1.83%. (Mars' API & sulfur content changes on a monthly basis. These changes will be reported in the relevant publication on a retroactive basis).

**Poseidon:** The assessment is for barrels delivered to Houma, Louisiana. API gravity is 29 and sulfur content is 1.85%. (Poseidon's API & sulfur content changes on a monthly basis. These changes will be reported in the relevant publication on a retroactive basis).

**Thunder Horse:** The assessment is for barrels delivered to Clovelly, Louisiana. API gravity is 29 and sulfur content is 1.85%. (Poseidon's API & sulfur content changes on a monthly basis. These changes will be reported in the relevant publication on a retroactive basis).

**Basrah Light:** The assessment is for waterborne barrels of Iraqi Basrah Light delivered into the US Gulf. The minimum volume is 500,000 bbl. API gravity is 31-35.5 and sulfur content is 2%. Basrah Light barrels are priced off the second month cash WTI assessment.

**Alaska North Slope (ANS):** This assessment reflects a minimum volume of 300,000 bbl basis delivered Long Beach, California, for the prompt month. API gravity is 29-31 and sulfur content is 1.1%

The pricing basis for ANS is a calendar month average of front month Platts cash WTI assessments in the delivery month. For example, on October 15, Platts assessments reflect November as the delivery month, and the ANS basis is an average of all front-month cash WTI assessments published in calendar November..

**Line 63:** The assessment is for a blend of crude at 28 degrees API gravity and sulfur content of 1.02%, delivered at Hynes station, California on Four Corners' pipeline line 63.

**P-Plus Line 63:** The assessment reflects the price of Line 63 sold into Hynes Station on Four Corners' pipeline on the basis of "Posting Plus." P-Plus deals are invoiced at a later date on the

basis of a differential to an average of one or more crude postings for Buena Vista crude.

**Thums:** The assessment is for barrels delivered to Long Beach, California at 17 degrees API and a sulfur content of 1.5%.

**Kern River:** The assessment is for barrels delivered commonly to Texaco's station 31 in Kern County, California, at 13 degrees API gravity with sulfur content of 1.1% The crude is synonymous with San Joaquin Valley (SJV) heavy.

## US CRUDE OIL POSTINGS

US crude oil postings Platts publishes daily *US Gulf Coast* crude oil posted prices on Platts Global Alert (PGA) pages 172 and 179, and in Platts North American CrudeWire, posted by the following companies: ChevronTexaco, ConocoPhillips, Valero, Link, Shell, ExxonMobil, Koch, Murphy, Plains, and Sunoco. Published prices reflect postings as of 5:30 p.m. local New York time.

Platts publishes daily *US West Coast* crude oil posted prices on Platts Global Alert (PGA) pages 159 and 446, posted by the following companies: ChevronTexaco, ExxonMobil, Shell, and Union76. Published prices reflect postings as of 3:15 p.m. local New York time.

## LATIN AMERICA

Platts assesses Latin American crude grades and publishes the differentials to their benchmark. Most transactions are concluded on a differential to WTI.

The rollover of the WTI benchmark is done on the first day after the 25th day of every month. Platts uses WTI 2nd line for all Latin crude assessments.

All Latin crude oil assessments reflect market-on-close (MOC) values at 3:15 PM Eastern Time . An explanation of the MOC methodology can be found elsewhere in this document. Please check the table of contents (also see related specifications document titled "Americas crude oil specifications guidelines").

Price assessments for Latin crudes are basis FOB the loading terminal, and do not include top-off charges. The minimum cargo volume is 350,000 bbl. The assessment window for all Latin American crudes is 15-45 days forward from date of publication.

**Canadon Seco:** Platts discontinued its spot Canadon Seco assessment on March 1, 2009.

**Cano Limon:** The assessment is for barrels commonly sold FOB Covenas, Colombia with API gravity of 29 and sulfur content of 0.5%.

**Castilla Blend:** The assessment reflects FOB Covenas, Colombia, minimum volume of 500,000 bbls, and has an API gravity of 18.8 and sulfur content of 1.96%.

**Cusiana:** Platts discontinued its spot Cusiana assessment on April 1, 2009.

**Escalante:** The assessment is for barrels commonly sold FOB Caleta Cordoba, Argentina with API gravity of 24.1 and sulfur content of 0.25% .

**Loreto:** The assessment is for barrels commonly sold FOB Puerto Bayovar, Peru with API gravity of 19.5 and sulfur content of 1.3%.

**Medanito:** Platts discontinued its spot Medanito assessment on August 1, 2008.

**Oriente:** The assessment is for barrels commonly sold FOB Esmeraldas, Ecuador with API gravity of 24.0 and sulfur content of 1.4%

**Vasconia:** The assessment is for barrels commonly sold FOB Covenas, Colombia with API gravity of 24.5 and sulfur content of 1.1%.

**Santa Barbara:** The assessment is for barrels commonly sold FOB Venezuela with API gravity of 36 and sulfur content of 0.95%.

**Napo:** The assessment is for barrels commonly sold FOB Esmeraldas, Ecuador with API gravity of 19 and sulfur content of 2.01%.

**Marlim:** The assessment is for barrels commonly sold FOB Sao Sebastiao, Brazil with API gravity of 19.2 and sulfur content of 0.78%.

**Roncador:** Platts launched a new assessment for Brazil's Roncador crude oil on May 1, 2009. The assessment is for barrels commonly sold basis FOB Angra dos Reis, with sulfur content of 0.58% and API gravity of 28.3.

**Mesa 30:** The assessment is for barrels commonly sold FOB Venezuela, with API gravity of 30 and sulfur content of 0.9% sulfur.

**Mexican Crude Assessments:** Mexican crude oil term prices to Western destinations are FOB and based on the following formulas:

To US Gulf Coast:

Maya:  $0.4(\text{WTS} + \text{USGC No. 6 3\%S}) + 0.1(\text{LLS} + \text{Dated Brent}) \pm \text{constant}$

Isthmus:  $0.4(\text{WTS} + \text{LLS}) + 0.2(\text{Dated Brent}) \pm \text{constant}$

Olmecca:  $0.333(\text{WTS} + \text{LLS} + \text{Dated Brent}) \pm \text{constant}$

To Europe:

Maya:  $0.527(\text{Dtd Brent}) + 0.467(\text{No.6 3.5\%}) - 0.25(\text{No.6.1\%} - \text{No.6 3.5\%}) \pm \text{constant}$

Isthmus:  $0.887(\text{Dtd Brent}) + 0.113(\text{No.6 3.5\%}) - 0.16(\text{No.6.1\%} - \text{No.6 3.5\%}) \pm \text{constant}$

To Asia:

Maya :  $(\text{Oman} + \text{Dubai})/2 \pm \text{constant}$

Isthmus:  $(\text{Oman} + \text{Dubai})/2 \pm \text{constant}$

**Maya:** The assessment is for barrels commonly sold FOB Dos Bocas and FOB Cayo Arcas with API gravity of 22 and sulfur content of 3.3%.

**Isthmus:** The assessment is for barrels commonly sold FOB Dos Bocas with API gravity of 33.6 and sulfur content of 1.3%.

**Olmecca:** The assessment is for barrels commonly sold FOB Dos Bocas and FOB Pajaritos with API gravity of 39.3 and sulfur content of 0.8%.

A calculation of each day's prices can be found on **Platts Global Alert** and in **Platts Latin American Wire**.

## CANADA

### POSTINGS-BASED

The following Canadian postings assessments are based on an average of two or more posted prices. These assessments are quoted in both Canadian dollars per cubic meters, and an equivalent price in US dollars per barrel.

**Par Crude:** The assessment is for sweet crude delivered at Edmonton, Alberta with 40.02 API gravity and 0.3% sulfur. Posted prices from Esso (Imperial), Suncor, and Shell are totaled and averaged for the assessed value of Par crude. Effective August 7, 2009, Platts removed PetroCanada's crude posted price from Platts' Canadian Postings Derived Crude Assessments for Par Crude (Edmonton Light Sweet). This price is being removed from the average because Suncor and PetroCanada, having recently merged, will be posting the exact same price.

**Mixed Light Sour:** The assessment is for mixed light sour delivered at Edmonton, Alberta. The posted price for Suncor—with 29.3 API gravity and 1.6% sulfur — and the posted price for PetroCanada—with 31.0 API gravity and 1.0% sulfur — are totaled and averaged for the assessed value of Mixed Light Sour.

**Bow River/Hardisty:** The assessment is for medium sour crude delivered at Hardisty, Alberta. The posted prices for PetroCanada, Esso, and Flint Hills (formerly Koch) are averaged for the value of Bow River/Hardisty.

**Cromer Light Sour:** The assessment is for light sour delivered at

Cromer. The posted prices for Sunoco, Petrocanada, Esso, Koch and Shell – with an average posted API gravity of 35.05 and an average sulfur content of 1.2% – are averaged for the assessed value of Cromer Light Sour.

**Sour at Edmonton:** The assessment is for Koch light sour delivered at Edmonton, Alberta. The posted prices for Petrocanada, Esso, Koch and Shell – with an average posted API gravity of 32.51 and an average sulfur content of 1.0% – are averaged for the assessed value of Sour at Edmonton.

**Cromer – Midale:** The assessment is for medium, sour delivered at Cromer. The posted price for Sunoco, Esso, Koch and Shell – with an average posted API gravity of 29.30 and an average sulfur content of 2.0% – are averaged for the assessed value of Cromer Midale.

### SPOT-BASED

The following spot assessments are calculated on a NYMEX crude oil settlement basis. Crudes will be assessed for injection in the first forward month. The outright assessments will be derived on the basis of the daily NYMEX second-month crude oil settlement plus the daily NYMEX third-month crude oil settlement (Canada ratio). Assessments are quoted in US dollars per barrel and Canadian dollars per cubic metre. Platts considers parcels of more than 100 b/d for injection.

All Canadian crude oil assessments reflect market-on-close (MOC) values at 3:15 PM Eastern Time. An explanation of the MOC methodology can be found elsewhere in this document. Please check the table of contents (also see related specifications document titled “Americas crude oil specifications guidelines”).

**Lloyd Blend:** The assessment is for barrels injected at Hardisty, Alberta. API gravity is 21.8 and sulfur content is 3.36%.

**Mixed Sweet:** Injection at Edmonton. Gravity is 38.8 and sulfur content is 0.47%.

**Light Sour Blend:** Injection at Cromer. API gravity is 34-36 and sulfur content is 1.2-1.4%

**Condensates:** Injection at Edmonton. API gravity is 50.0 and sulfur content is 0.20%.

**Syncrude Sweet Blend:** Injection at Edmonton. API gravity is 31-33 and sulfur content is 0.1-0.2%.

**Western Canadian Select (WCS):** Injection at Hardisty. API gravity is 19-22 and sulfur content is 2.8-3.2%.

**Cold Lake:** Injection at Hardisty. API gravity is 19.9 and sulfur content is 3.25%.

The following **Canadian cargo** assessments are based on spot transactions for cargoes loading 28 to 42 days forward from the

date of publication. The outright price is derived from the forward value of Dated Brent with pricing typically 1-5 days after loading. The typical cargo volume is about 675,000 bbl for Hibernia and Terra Nova, and 900,000 bbl for White Rose. The Canadian cargo markets are assessed up to 11:30 a.m. Eastern Time.

**Hibernia:** The assessment is for barrels loading FOB terminal basis Whiffenhead, Newfoundland, Canada. The API gravity is 36.0 and the sulfur content is 0.4%.

**Terra Nova:** The assessment is for barrels loading FOB terminal basis Whiffenhead, Newfoundland, Canada. The API gravity is 32.9-33.4 and the sulfur content is 0.48%

**White Rose:** This assessment reflects barrels loading FOB terminal b Sea Rose, Newfoundland, Canada. The API gravity is 30.56 degrees and sulfur content of 0.28%.

### CANADIAN CRUDE OIL POSTINGS

Platts publishes daily crude oil posted prices on Platts Global Alert (PGA) pages 149 and 435, and in Platts North American CrudeWire, posted by the following companies: Esso (Imperial), Suncor, PetroCanada, Shell, and Flint Hills. Published prices reflect postings as of 3:15 p.m. Eastern Time. Platts daily Canadian Postings Derived Crude Assessments are derived from the averages of all postings for each crude assessed as of 3:15 p.m. Eastern Time.

## UNSCHEDULED NYMEX CLOSURES

In the event that the New York Mercantile Exchange is closed unexpectedly, all US crude assessments will be produced. Platts believes there will be adequate OTC trade in the Brent/WTI market and the market for grade differentials to produce an accurate assessment. That policy also will apply to Latin American crudes. Based on past history, Platts does not believe there will be adequate flat price OTC trade in the markets for light ends in the US Gulf Coast, US Atlantic Coast and the US Midcontinent to serve as a substitute for an outright NYMEX settlement.

Instead, those markets will be assessed by adjusting the prior day's NYMEX settlement up or down by an amount equivalent to the equalized per gallon price of the \$/bbl movement in the Platts' WTI assessment for Gulf Coast and Midcontinent, and its 15-day Brent assessment for the US Atlantic Coast. New assessments of market differentials will then be applied against those prices to determine the final assessment. West Coast light ends, residual fuel, bunker fuel, LPG, MTBE and other blendstocks will be produced as normal.

Platts also reserves the right to suspend assessments should there be a major calamity, such as the events of September 11.

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## TRADING PLATFORMS

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Platts treats firm trading positions and deals from Internet platforms exactly as it does any other information from principals or from intermediaries such as voice brokers. Platts cannot make any guarantee in advance about how and whether the information will be incorporated in its final assessments. All trading positions and deals submitted to Platts need to meet general requirements on openness and transparency. Platts market specialists then make an assessment based on published assessment parameters using all the information available.

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## CODE LIST FOR CRUDE OIL MARKETWIRE

### Key benchmarks (\$/bbl)

Brent (M1)	PCAAP00	WTI (M1)	PCACG00	Mars (M1)	AAMBR00
Brent (M2)	PCAAQ00	WTI (M2)	PCACH00	Mars (M2)	AAMBU00
Brent (M3)	PCAA000	WTI (M3)	AAGIT00	Mars (M3)	AAMBX00
Brent (Dated)	PCAAS00	Brent/Dubai	AAJMS00	BTC Dated Strip	AAUFI00
Dated North Sea Light	AAOFD00	Mediterranean Dated Strip	AALDF00	Angola Dated Strip	AALGM00
North Sea Dated Strip	AAKWH00	West Africa Dated Strip	AALDH00		
Canada Dated Strip	AALDJ00			Sulfur De-escalator	AAUXL00

### Dtd Brent swap

CFD 1wk	PCAKA00	CFD 2wk	PCAKC00
	AAJNV00		AAJOS00
CFD 3wk	PCAKE00	CFD 4wk	PCAKG00
	AAJOU00		AAJOW00
CFD 5wk	AAGLU00	CFD 6wk	AAGLV00
	AAJPC00		AAJPE00
CFD 7wk	AALCZ00	CFD 8wk	AALDA00
	AALAW00		AALAX00

Dubai (M1)	PCAT00	Oman (M1)	PCABS00	Oman (M1) MOG	PCABT00
Dubai (M2)	PCAAU00	Oman (M2)	AAHZF00	Oman (M2) MOG	AAIH000
Dubai (M3)	PCAAV00	Oman (M3)	AAZH00	Oman (M3) MOG	AAIHP00
MEC (M1)	AAWSA00	Upper Zakum	AAOUQ00		
MEC (M2)	AAWSB00				
MEC (M3)	AAWSC00				

MOG Swap Diff (M1)	AALHU00				
MOG Swap Diff (M2)	AAIHJ00	Dubai Swap (M1)	AAHZJ00	MOG Swap (M1)	AAHZP00
MOG Swap Diff (M3)	AAIHL00	Dubai Swap (M2)	AAHZL00	MOG Swap (M2)	AAHZR00
MOG Swap Diff (M4)	AAIHN00	Dubai Swap (M3)	AAHZN00	MOG Swap (M3)	AAHZT00

Brent/WTI 1st	AALAT00	Brent EFP (M1)	AAGVW00	WTI EFP (M1)	AAGVT00
Brent/WTI 2st	AALAU00	Brent EFP (M2)	AAGVX00	WTI EFP (M2)	AAGVU00
Brent/WTI 3st	AALAV00	Brent EFP (M3)	AAGVY00	WTI EFP (M3)	AAGVV00

### Platts euro-denominated crude oil assessments

#### European crude oil benchmarks (euro/bbl)

Dated Brent	AAPYR00
Urals Mediterranean	AAPYS00

#### US crude oil benchmarks (euro/bbl)

WTI (M1)	AAPYT00
Mars(M1)	AAPYU00

### North Sea spot crude assessments

#### spread vs fwd Dated Brent

BNB	AAVJA00	AAVJB00
Forties	PCADJ00	AAGWZ00
Statfjord	PCAEE00	AAGXD00
Flotta	PCACZ00	AAGXH00
Ekofisk	PCADIO0	AAGXB00
Oseberg	PCAEU00	AAGXF00
North Sea Basket	AAGIZ00	

## West African spot crude assessments

	<b>\$/bbl</b>	<b>spread vs fwd Dated Brent</b>
Bonny Light	PCAIC00	AAGXLOO
Qua Iboe	PCAI000	AAGXN00
Forcados	PCABC00	AAGXP00
Escravos	AAEIZ00	AAGXR00
Brass River	AAEJB00	AAGXV00
cabinda	PCAFD00	AAGXT00
Girassol	AASNLOO	AASJD00
Hungo	AASLJ00	AASJF00
Kissanje	AASLK00	AASJE00

## Mediterranean spot crude assessments

	<b>\$/bbl</b>	<b>spread vs fwd Dated Brent</b>
Urals (Rotterdam)	PCAFW00	AAGXJ00
Urals (Mediterranean)	PCACE00	AAGXX00
Urals (Ex-Novorossiisk)	AAGZS00	AAHPH00
Urals (Ex-Novo) FOB 80kt	AAOTH00	AAOTI00
Urals (Ex-Baltic)	AAGZT00	AAHPI00
Urals (Primorsk)	AAWVH00	AAWVIOO
Urals RCMB (Recombined)	AALIN00	
Siberian Light CIF	AAGZW00	AAHPK00
CPC Blend CIF	AAGZU00	AAHPLOO
Azeri Light CIF	AAGZX00	AAHPM00
BTC FOB Ceyhan	AAUFH00	AAUFJ00
Suez Blend	PCACA00	AAGYD00
Es Sider	PCACO00	AAGYH00
Kirkuk	AAEJD00	AAGYF00
Iranian Light (Sidi Kerir)	PCABIOO	AAGXZ00
Iranian Heavy (Sidi Kerir)	PCABH00	AAGYB00
Saharan Blend	AAGZY00	AAHPN00
Zarzaitine	AAHMO00	AALOY00
Kumkol	AAHMPOO	AALOW00
Syrian Light FOB	AAHMM00	AALOU00
Syrian Heavy FOB	AAHMNOO	AALOV00
	<b>\$/bbl</b>	<b>Dtd Brent swap</b>
Urals Med CFD 1st mth (M1)	AAMDR00	AAMDU00
Urals Med CFD 2st mth (M2)	AAMDXX00	AAMEA00

## Platts Ruble-denominated Russian crude oil assessments

## Russian crude oil benchmarks (Ruble/bbl)

Urals FOB Novorossiisk	AAUJPOO
Urals FOB Ventspils	AAUJQ00
Urals FOB Novorossiisk 80kt	AAUJROO
Urals FOB Mediterranean	AAUJS00
Urals FOB Rotterdam	AAUJTOO

## Canadian spot crude cargo assessments

	<b>\$/bbl</b>	<b>spread vs fwd Dated Brent</b>
Terra Nova	AAJUHO0	AAJUJ00
Hibernia	AAJKK00	AAJKM00
White Rose	AAVJX00	AAVJY00

## US domestic spot crude assessments

P-Plus WTI	PCACIOO
WTI-Delta	AAEJK00
P-5 WTI	AAFENOO

	<b>\$/bbl</b>	<b>spread vs 1st line WTI</b>
WTI (Midland)	PCACJ00	AAGVZ00
WTS (M1)	PCACK00	AAGWBO0
WTS (M2)	AAURG00	AAURH00
Eugene	PCAF000	AAGWD00
Bonito	PCAIE00	AAGWFO0
SGC	AASOI00	AASOJ00
Poseidon	AABHK00	AAGWLO0
LLS (M1)	PCABN00	AAGWN00
LLS (M2)	AAURC00	AAURD00
HLS (M1)	PCABD00	AAGWPO0
HLS (M2)	AAURE00	AAURFO0
Wyoming Sweet	PCACM00	AAGWRO0
Thunder Horse	AAWZK00	AAWZLO0
Mars/WTI (M1)	AAGWH00	
Mars/WTI (M2)	AAKTH00	
Mars/WTI (M3)	AAMBO00	

### Delivered US Gulf Coast spot price

	<b>\$/bbl</b>	<b>spread vs 2st line WTI</b>
Basrah Light	AAEJH00	AAGWVO0

### Latin American spot crude assessment

	<b>\$/bbl</b>	<b>spread vs 2st line WTI</b>
Cano Limon	PCADM00	PCAGV00

### California spot crude assessment

Lyne 63/Hynes	PCABM00	
Thums/Long Beach	PCACD00	
Kern River	PCABJ00	
P-Plus Line 63	PCAFV00	

	<b>\$/bbl</b>	<b>spread vs 2st line WTI</b>
ANS/Long Beach	PCAAD00	AAGWX00

### Canadian spot crude assessments

	<b>C\$/CM</b>	<b>USD/BBL</b>	<b>spread vs Canada</b>
Lloyd Blend	AALRM00	AALRK00	AALRP00
Mixed Sweet	AALRT00	AALRR00	AALRV00
Light Sour Blend	AALRZ00	AALRX00	AALSD00
Condensates	AALSH00	AALSFO0	AALSJ00
Syncrude Sweet	AASOL00	AASOK00	AASOM00
WCS Hardisty	AAPPO00	AAPPN00	AAPPP00
Cold Lake Hardisty	AASZY00	AASZX00	AASZZ00

### Canadian crude oil postings derived assessments

	<b>C\$/CM</b>	<b>USD/BBL</b>
Par Crude	PCAEZ00	PCAEJ00
Mixed Light Sour	PCAFA00	PCAELO0
Bow River/Hardisty	PCAEY00	PCAFB00
Light/Sour Cromer	PCAIIO0	PCAIK00
Sour - Edmonton	PCAIM00	PCAI000
Midale Cromer	PCAIQ00	PCAIS00

## Latin American assessments

	<b>\$/bbl</b>	<b>sprea vs WTI</b>
Canadon Seco	PCAGN00	PCAGB00
Escalante	PCAG000	PCAGC00
Cusiana	PCAGT00	PCAGL00
Santa Barbara	AAITJ00	AAITD00
Loreto	PCAGQ00	PCAGH00
Oriente	PCAGU00	PCADE00
Napo	AAMCD00	AAMCA00
Marlim	AAITL00	AAITF00
Castilla Blend	AAVEQ01	AAVEQ00
Cano Limon	PCAGV00	PCADM00
Vasconia	PCAGR00	PCAGI00
Mesa 30	AAITH00	AAITB00

## Pacific Rim / Arab Gulf spot

	<b>\$/bbl</b>	<b>spread vs Tapis</b>
Tapis	PCACB00	PCAHA00
Kikeh	AAWUH00	AAWUI00
Cossack	PCAGZ00	PCAHC00
Griffin	PCAGW00	PCAHE00
Kutubu	PCAFJ00	PCAHB00
Nanhai	PCAFR00	PCAHG00
Paper Tapis (M1)	PCAFG00	
Paper Tapis (M2)	PCAFH00	
Labuan	PCABL00	
Miri	PCABQ00	
Gippsland	PCACP00	
		<b>spread vs NW Shelf</b>
NW Shelf	PCAGX00	PCAIA00
		<b>spread vs ICP</b>
Minas	PCAB000	PCABP00
Sokol	AASCJ00	AASCK00
Attaka	PCAAJ00	PCAAK00
Ardjuna	PCACQ00	PCACR00
Handil Mix	PCABE00	PCABF00
Cinta	PCAAX00	PCAAY00
Duri	PCABA00	PCABB00
Widuri	PCAFE00	PCAFF00
Belida	PCAFLO0	PCAFM00
Senipah	AAEOE00	AAEOK00
		<b>spread vs OSP</b>
Murban	AAKNL00	AAKUB00
Lower Zakum	AAKNNO0	AAKUFO0
Upper Zakum	AAOUQ00	AAOUR00
Umm Shaif	AAOUO00	AAOUP00
Qatar Land	AAKNP00	AAKUJ00
Qatar Marine	AAKNR00	AAKUH00
Banoco Arab Medium	AAKNTO0	AAKUD00
Ras Gas	AAPETO0	AAPEU00
Al Shaheen	AAPEVO0	AAPEW00
Nile Blend	AAPLCO0	AAPEX00
Daqing	PCAAZ00	
Shengli	PCABY00	
Bach Ho	PCAHY00	AAPEY00

## Asia close Brent and WTI spot

Brent (M1)	PCAJE00	WTI (M2)	AAFFW00
Brent (M2)	PCAJG00	WTI (M3)	AAFFY00
Brent (M3)	PCAJI00		
WTI (M1)	AAFFU00		

**Asian Dated Brent and Asian Crude**

Asian Dated Brent (ADB) AAXPG00

Asian Crude Index (ACX) AAXILOO

**Daily OPEC Basket Price**

AAFAE00

**Daily US\$ vs EURO exchange rate**

Forex rate at 04:30 PM local time AAFCW00

**Crude futures settlements****Nymex**

M1	M2	M3	M4	Volume
AACMH00	AACMI00	AACMJ00	AADWE00	AADUV00

**DME Oman**

M1	M2	M3	M4	Volume
DUM2629	DUM2630	DUM2631	DUM2632	DUM0126

**DME Oman Asian Settle**

XDOA001	XDOAV01
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**ICE/IPE WTI**

M1	M2	M3	M4	Volume
DUM3489	DUM3490	DUM3491	DUM3492	DUM0014

**ICE/IPE Brent**

M1	M2	M3	M4	Volume
AACNF00	AACNG00	AACNQ00	AADWV00	AADUV00

**ICE/IPE Mideast Crude**

M1	M2	M3	M4	Volume
DUM2610	DUM2611	DUM2612	DUM2613	DUM2628

**ICE/IPE BWAWE**

	M1	M2
	AADRPO0	AADRM00
Volume	AAEFS00	AAEFT00

**Products futures settlements****Nymex RBOB unleaded gasoline**

M1	M2	M3	M4	Volume
DUMRB01	DUMRB02	DUMRB03	DUMRB04	DUMRB05

**Nymex No. 2**

M1	M2	M3	M4	Volume
AACMK00	AACMO00	AACMP00	AADWH00	AADUW00

**Nymex Natural Gas**

M1	M2	M3	M4	Volume
AACMZ00	AACNA00	AACNB00	AADWS00	AACUI00

**ICE/IPE Gasoil**

M1	M2	M3	M4	Volume
AACNX00	AACNZ00	AACOA00	AADXE00	AADUW00

**Yields and Netbacks**

	ARA			Singapore			US Gulf Coast			US Midcontinent		
	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback
<b>Arab Light (Most recent FOB spot: N.A.)</b>												
Cracking	TYABT00	TDDAV00	Yield-Freight	TYACF00	TDDAW00	Yield-Freight	TYACP00	TDDAR00	Yield-Freight	TYACT00	TDDAS00+1.19	Yield-Freight
Coking							TYACN00	TDDAR00	Yield-Freight	TYACR00	TDDAS00+1.19	Yield-Freight
Visbreaking	TYABV00	TDDAV00	Yield-Freight	TYACH00	TDDAW00	Yield-Freight						
<b>Arab Medium (Most recent FOB spot: N.A.)</b>												
Cracking	TYACZ00	TDDBD00	Yield-Freight	TYADL00	TDDBE00	Yield-Freight	TYADV00	TDDAZ00	Yield-Freight			
Coking							TYADT00	TDDAZ00	Yield-Freight			
Visbreaking	TYADB00	TDDBD00	Yield-Freight	TYADN00	TDDBE00	Yield-Freight						
<b>Arab Heavy (Most recent FOB spot: N.A.)</b>												
Cracking	TYAAV00	TDDAN00	Yield-Freight	TYABH00	TDDA000	Yield-Freight	TYABR00	TDDAJ00	Yield-Freight			
Coking							TYABP00	TDDAJ00	Yield-Freight			
Visbreaking	TYAAX00	TDDAN00	Yield-Freight	TYABJ00	TDDA000	Yield-Freight						
<b>Arab Berri (Most recent FOB spot: N.A.)</b>												
Cracking							TYAAL00	TDDAC00	Yield-Freight	TYAAP00	TDDAD00+1.19	Yield-Freight
Coking							TYAJJ00	TDDAC00	Yield-Freight	TYAAN00	TDDAD00+1.19	Yield-Freight
<b>Attaka (Most recent FOB spot:N.A.)</b>												
Cracking				TYADX00	TDDBG00	Yield-Freight						
Visbreaking				TYADZ00	TDDBG00	Yield-Freight						
<b>Azeri Light (Most recent FOB spot: N.A.)</b>												
Cracking	TYAEB00	TDDBI00	Yield-Freight									
Visbreaking	TYAED00	TDDBI00	Yield-Freight									
<b>Basrah Light (Most recent CIF Gulf Coast spot: N.A.)</b>												
Cracking	TYAFP00	TDDBU00	Yield-Freight				TYAGD00	TDDBS00	Yield-Freight	TYAGH00	TDDBT00+1.19	Yield-Freight
Coking							TYAGB00	TDDBS00	Yield-Freight	TYAGF00	TDDBT00+1.19	Yield-Freight
Visbreaking	TYAFR00	TDDBU00	Yield-Freight									
<b>BCF 17 (Most recent FOB spot: N/A)</b>												
Cracking							TYAEP00	TDDBJ00	Yield-Freight			
Coking							TYAEN00	TDDBJ00	Yield-Freight			
<b>BCF 22 (Most recent FOB spot: N/A)</b>												
Cracking							TYAFB00	TDDBL00	Yield-Freight			
Coking							TYAEZ00	TDDBL00	Yield-Freight			
<b>BCF 24 (Most recent FOB spot: N/A)</b>												
Cracking							TYAFJ00	TDDBO00	Yield-Freight			
Coking							TYAFH00	TDDBO00	Yield-Freight	TYAFLO0	TDDBP00+1.13	Yield-Freight
<b>Bonny Light (Most recent FOB spot: N.A. )</b>												
Cracking							TYAGR00	TDDBX00	Yield-Freight	TYAGT00	TDDBY00+1.19	Yield-Freight
Bow River (Most recent FOB spot: N.A.)												
Coking										TYAGV00	DUM0665	Yield-Freight
<b>Brass (Most recent FOB spot: N.A.)</b>												
Cracking	TYATSO0	DUM0957	Yield-Freight				TYAHD00	TDDCA00	Yield-Freight			
<b>Brent (Most recent FOB spot: N.A.)</b>												
Cracking	TYAHF00	TDDCD00	Yield-Freight				TYAHT00	TDDCB00	Yield-Freight			
Coking							TYAHR00	TDDCB00	Yield-Freight			
Visbreaking	TYAHH00	TDDCD00	Yield-Freight									
<b>Cabinda (Most recent FOB spot: N.A.)</b>												
Cracking							TYAIF00	TDDCF00	Yield-Freight	TYAIJ00	TDDCG00+1.19	Yield-Freight
Coking							TYAID00	TDDCF00	Yield-Freight	TYAIH00	TDDCG00+1.19	Yield-Freight
<b>Cano Limon (Most recent FOB spot: N.A.)</b>												
Cracking							TYAIR00	TDDCJ00	Yield-Freight	TYAIV00	TDDCK00+1.19	Yield-Freight
Coking							TYAIP00	TDDCJ00	Yield-Freight	TYAIT00	TDDCK00+1.19	Yield-Freight
<b>Cusiana (Most recent FOB spot: N.A.)</b>												
Cracking							TYAJH00	TDDCM00	Yield-Freight	TYAJL00	TDDCN00+1.19	Yield-Freight
Coking							TYAJF00	TDDCM00	Yield-Freight	TYAJJ00	TDDCN00+1.19	Yield-Freight
<b>Dubai (Most recent FOB spot: N.A.)</b>												
Cracking				TYAJN00	TDDCQ00	Yield-Freight						
Visbreaking				TYAJP00	TDDCQ00	Yield-Freight						
<b>Duri (Most recent FOB spot: N.A.)</b>												
Cracking				TYAJR00	TDDCR00	Yield-Freight						
Visbreaking				TYAJT00	TDDCR00	Yield-Freight						
<b>Ekofisk (Most recent FOB spot: N.A.)</b>												
Cracking	TYAJV00	TDDCT00	Yield-Freight									
Visbreaking	TYAJX00	TDDCT00	Yield-Freight									
<b>Escalante (Most recent FOB spot: N.A.)</b>												
Cracking							TYAKJ00	TDDCV00	Yield-Freight			
Coking							TYAKH00	TDDCV00	Yield-Freight			
<b>Flotta (Most recent FOB spot: N.A.)</b>												
Cracking	TYAKP00	TDDCX00	Yield-Freight									
Visbreaking	TYAKR00	TDDCX00	Yield-Freight									

**Yields and Netbacks**

	ARA			Singapore			US Gulf Coast			US Midcontinent		
	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback
<b>Forcados (Most recent FOB spot: N.A.)</b>												
Cracking							TYAX00	TDDCY00	Yield-Freight	TYAKZ00	TDDCZ00+1.19	Yield-Freight
<b>Forties (Most recent FOB spot: N.A.)</b>												
Cracking	TYALB00	TDDEZ00	Yield-Freight									
Visbreaking	TYALD00	TDDEZ00	Yield-Freight									
<b>Gulfaks (Most recent FOB spot: N/A)</b>												
Cracking	TYALF00	TDDDC00	Yield-Freight									
Visbreaking	TYALH00	TDDDC00	Yield-Freight									
<b>Iran Heavy (Most recent FOB spot, Sidi Kerir: N.A.)</b>												
Cracking	TYALV00	TDDDG00	Yield-Freight									
Visbreaking	TYALX00	TDDDG00	Yield-Freight									
<b>Iran Light (Most recent FOB spot, Sidi Kerir: N.A.)</b>												
Cracking	TYAMD00	TDDDI00	Yield-Freight									
Visbreaking	TYAMF00	TDDDI00	Yield-Freight									
<b>Isthmus (Most recent FOB spot: N.A.)</b>												
Cracking							TYAMR00	TDDDJ00	Yield-Freight			
Coking							TYAMP00	TDDDJ00	Yield-Freight			
<b>Kirkuk (Most recent FOB spot: N.A.)</b>												
Cracking	TYATU00	TDDGH00	Yield-Freight									
<b>Kuwait (Most recent FOB spot: N.A.)</b>												
Cracking	TYAMX00	TDDDM00	Yield-Freight	TYANF00	TDDDN00	Yield-Freight	TYANL00	TDDDL00	Yield-Freight			
Coking							TYANJ00	TDDDL00	Yield-Freight			
Visbreaking	TYAMZ00	TDDDM00	Yield-Freight	TYANH00	TDDDN00	Yield-Freight						
<b>LLS (Most recent FOB spot: N.A.)</b>												
Cracking							TYANP00	DUM0663	Yield-Freight	TYANT00	DUM0666	Yield-Freight
Coking							TYANN00	DUM0663	Yield-Freight	TYANR00	DUM0666	Yield-Freight
<b>Marlim (Most recent FOB spot: N.A.)</b>												
Cracking							TYAUG00	TDDGK00	Yield-Freight			
Coking							TYAUE00	TDDGK00	Yield-Freight			
<b>Mars (Most recent FOB spot: N.A.)</b>												
Cracking							TYAOB00	DUM0664	Yield-Freight			
Coking							TYANZ00	DUM0665	Yield-Freight			
<b>Maya (Most recent FOB spot: N.A.)</b>												
Cracking							TYAOJ00	TDDDP00	Yield-Freight			
Coking							TYAOH00	TDDDP00	Yield-Freight	TYAOL00	TDDDQ00+1.19	Yield-Freight
<b>Merey (Most recent FOB spot: N/A)</b>												
Cracking							TYAOZ00	TDDDT00	Yield-Freight			
Coking							TYAOX00	TDDDT00	Yield-Freight			
<b>Mesa (most recent FOB spot: 46.37)</b>												
Cracking							TYAPL00	TDDDV00	Yield-Freight	TYAPP00	TDDFC00+1.13	Yield-Freight
Coking							TYAPJ00	TDDDV00	Yield-Freight	TYAPN00	TDDFC00+1.13	Yield-Freight
<b>Minas (most recent FOB spot: N.A.)</b>												
Cracking				TYAPR00	TDDDX00	Yield-Freight						
Visbreaking				TYAPT00	TDDDX00	Yield-Freight						
<b>Mixed Light Sour (Most recent FOB spot: N.A.)</b>												
Cracking										TYAPX00	DUM0668	Yield-Freight
Coking										TYAPV00	DUM0668	Yield-Freight
<b>Mixed Light Sweet (Most recent FOB spot: N.A.)</b>												
Cracking										TYAQZ00	DUM0669	Yield-Freight
Coking										TYAQX00	DUM0669	Yield-Freight
<b>Murban (most recent FOB spot: N.A.)</b>												
Cracking	TYATQ00	DUM0956	Yield-Freight	TYAPY00	TDDCQ00	Yield-Freight						
Visbreaking				TYAQAO0	TDDCQ00	Yield-Freight						
<b>Qatar Dukhan (most recent FOB spot: N.A.)</b>												
Cracking				TYARA00	TDDBE00	Yield-Freight						
Visbreaking				TYARCO0	TDDBE00	Yield-Freight						
<b>Qatar Marine (most recent FOB spot: N.A.)</b>												
Cracking				TYARE00	TDDBE00	Yield-Freight						
Visbreaking				TYARG00	TDDBE00	Yield-Freight						
<b>Umm Shaif (most recent FOB spot: N.A.)</b>												
Cracking				TYATK00	TDDCQ00	Yield-Freight						
Visbreaking				TYATMO0	TDDCQ00	Yield-Freight						
<b>Zakum (Lower) (most recent FOB spot: N.A.)</b>												
Cracking				TYANS00	TDDCQ00	Yield-Freight						
Visbreaking				TYANU00	TDDCQ00	Yield-Freight						
<b>Olmecca (most recent FOB spot: N.A.)</b>												
Cracking							TYAQF00	TDDDY00	Yield-Freight	TYAQJ00	TDDDZ00+1.19	Yield-Freight
Coking							TYAQD00	TDDDY00	Yield-Freight	TYAQH00	TDDDZ00+1.19	Yield-Freight

## Yields and Netbacks

	ARA			Singapore			US Gulf Coast			US Midcontinent		
	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback	Yield	Freight	Netback
<b>Oman (most recent FOB spot: N.A.)</b>												
Cracking				TYAQL00	TDDEB00	Yield-Freight						
Visbreaking				TYAQN00	TDDEB00	Yield-Freight						
<b>Rabi (most recent FOB spot: N/A)</b>												
Cracking							TYARP00	TDDEE00	Yield-Freight			
Coking							TYARN00	TDDEE01	Yield-Freight			
<b>Saharan Blend (Most recent FOB spot: N.A.)</b>												
Cracking	TYATY00	TDDGI00	Yield-Freight									
<b>Statfjord (most recent FOB spot: N.A.)</b>												
Cracking	TYASD00	DUM0658	Yield-Freight				TYASR00	TDDEN00	Yield-Freight			
Coking							TYASP00	TDDEN00	Yield-Freight			
Visbreaking	TYASF00	DUM0658	Yield-Freight									
<b>Soyo/Palanca (most recent FOB spot: N/A)</b>												
Cracking							TYASB00	TDDEH00	Yield-Freight			
Coking							TYARZ00	TDDEH00	Yield-Freight			
<b>Syncrude (Most recent FOB spot: N/A)</b>												
Cracking										TYAUR00	1.53	Yield-Freight
<b>Tapis (Most recent FOB spot: N.A.)</b>												
Cracking				TYAST00	TDDE000	Yield-Freight						
Visbreaking				TYASV00	TDDE000	Yield-Freight						
<b>Troll (most recent FOB spot: N/A)</b>												
Cracking							TYATL00	TDDEP00	Yield-Freight			
Coking							TYATJ00	TDDEP00	Yield-Freight			
<b>Urals (Most recent CIF ARA spot: N.A.)</b>												
Cracking	TYATN00	TDDET00	Yield-Freight				TYAUK00	DUM1679	Yield-Freight			
Coking							TYAUI00	DUM1679	Yield-Freight			
Visbreaking	TYATP00	TDDET00	Yield-Freight									
<b>WTI (most recent FOB spot: N.A.)</b>												
Cracking							TYATX00	DUM0713	Yield-Freight	TYAUB00	DUM0670	Yield-Freight
Coking							TYATV00	DUM0713	Yield-Freight	TYATZ00	DUM0670	Yield-Freight
<b>WTS (Most recent CIF spot: N.A.)</b>												
Cracking										TYAUJ00	DUM0671	Yield-Freight
Coking										TYAUH00	DUM0671	Yield-Freight
<b>Zuetina (Most recent FOB spot: N.A.)</b>												
Cracking	TYAUC00	TDDGJ00	Yield-Freight									