METHODOLOGY AND SPECIFICATIONS GUIDE

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ARGUS CRUDE

Contents:

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The most up-to-date Argus Crude methodology is available on www.argusmedia.com

Introduction

Argus Crude is a daily market report that covers the international crude oil market. It is one of the leading reports serving the oil industry and is widely used as a reference in the pricing of crude oil.

Argus Crude contains price assessments for different grades of crude oil. The report also contains market commentary for the various regional markets.

Argus Crude provides prices that are used in third-party contracts, risk management contracts (such as swaps), underlying futures settlement prices, internal price transfer, internal benchmarking, mark-to-market assessment and market analysis.

The assessed crude prices are based on prices from the open spot market whenever possible. There are many regional markets in crude and they all have unique characteristics based on contractual terms, scheduling, logistics, liquidity and transparency. As a result, the *Argus* approach to reporting prices in each market will vary according to the prevailing conditions and the nature of each market. In general, *Argus* reflects prices as traded in open markets and constructs price series based on the structure of the market as established by industry participants.

Argus uses a variety of methodological approaches to identify market prices. Usually *Argus* identifies prices through a process of intelligent interpretation based on bids, offers, and transactional information. *Argus* reduces the possibility of price report manipulation, or unintended distortion, by applying intelligent interpretation to the weighting of information it receives. In some markets, *Argus* will produce trade weighted averages when the industry requests them and there is enough market liquidity to justify them.

Argus Crude regularly reviews the methodological approaches that are applied to each market through extensive consultation with the industry. Amendments to the methodology will be made when necessary to reflect the changes in the structure of crude trading and any changes in the pricing or contractual norms of each market.

The price assessments in *Argus Crude* are based on market surveys that are conducted over the telephone and through electronic mail exchanges. *Argus* uses all appropriate informational sources to identify the prices prevailing in a market and does not restrict itself to one subsection of the market, such as a single trading platform or any single informational channel. The market surveys are balanced in their approach and are conducted by well trained specialists who are part of a dedicated team responsible for the *Argus Crude* report.

The market surveys of each region will involve up to 30 market participants contacted by telephone, email or instant messenger. The information we gather is analysed and verified. The approach is methodical, standardised and tested against the views of other market participants.

Information from the survey is verified as best as possible and archived in databases. The methodologies are detailed and transparent. A professional approach by trained staff monitored by experienced managers is a characteristic of the *Argus* tradition.

All assessments and formulas refer to the price of the crude on the day of the published report and are expressed in US dollars per barrel unless otherwise stated. The prices are for contracts under whatever general terms and conditions are accepted as the standard prevailing in that particular market. All changes are on the last report (one working day previous).

Overview (*Argus Crude* page 1)

Argus provides an overview of the day's crude market activity, highlighting changes in key crude prices and the price differences among the various regional crudes. The report discusses that day's market activity with particular reference to the main crude benchmark prices. The summary has a global scope, allowing readers to quickly understand the key market drivers.

Pricing tables (*Argus Crude* page 1)

North Sea, Russia-Caspian, Mediterranean and West Africa

The front page of *Argus Crude* contains duplicate assessments of the crude prices in the various regional sections. For the North Sea, Russian-Caspian (including fob netbacks) Mediterranean, and West Africa, prices are published as fixed price assessments and also shown as differentials to the benchmarks. The primary benchmark in the Atlantic Basin is Dated, but Dated itself is shown as a differential to the forward 21-day North Sea price (the "flat" price).

The price methodology for these regions is described in the various regional sections below.

Mideast Gulf

The Mideast Gulf table contains the price assessments made at 4:30pm Singapore time for front month Dubai, front month Oman, and the Abu Dhabi crude Murban.

The Dubai price is published as a fixed price assessment. The Oman price is published as a fixed price assessment and is also shown as a differential to Dubai swaps.

The Murban price is published as a fixed price assessment and also shown as a differential to the Abu Dhabi National Oil Company (Adnoc) OSP.

Asia-Pacific

The Asia-Pacific table contains the price assessments made at 4:30pm Singapore time for Minas, Tapis and Bach Ho crudes.

The Indonesian Minas crude price is published as a fixed price assessment and as a differential to the Indonesian Crude Price (ICP).

Malaysian Tapis crude is published as a fixed price assessment and as a differential to the Tapis Asia Petroleum Price Index (APPI).

Australian Northwest Shelf condensate is published as a fixed price

assessment and as a differential to North Sea Dated, and Substitute Dated on UK holidays (see Asia-Pacific section below).

ESPO Blend is published as a fixed price assessment and as a differential to the Dubai price for the month of loading.

Sokol is published as a fixed price assessment and as a differential to Dubai swaps for the month of loading.

US pipeline

The US pipeline table contains the prices for LLS, Mars and the *Argus Sour Crude Index™ (ASCI™)* benchmark, LLS, Mars and *ASCI* prices are published as fixed price assessments and as differentials to the front month Nymex WTI settlement price.

Canada pipeline

The Canada pipeline table contains the prices for Canadian Synthetic and WCS, published as fixed price assessments.

Americas cargoes

The Americas cargoes table contains the prices for Nigerian Qua Iboe and Colombian Vasconia, published as fixed price assessments.

Futures markets (*Argus Crude* page 2)

Argus Crude shows market information from four world futures markets which trade crude oil. These futures exchanges are the London-based IntercontinentalExchange's Brent contract (Ice Brent), the New York Mercantile Exchange's Light Sweet Crude contract (Nymex WTI), the Tokyo-based Tocom Mideast Gulf crude contract and the Dubai Mercantile Exchange's Oman contract.

Argus Crude publishes representative price and market information from the futures exchanges including the Open, High, Low and Settle prices and where possible the estimated volume of trade.

Forward spreads (*Argus Crude* page 2)

Argus Crude shows the North Sea/Dubai spreads for three months forward, the WTI/North Sea spreads for four months forward and the WTI/Dubai spreads for three months forward, timestamped at 4:30pm London time. *Argus* also shows the Tapis/North Sea spread for three months forward and the Tapis/Dubai spread for three months forward, timestamped at 4:30 Singapore time.

Forward markets (*Argus Crude* page 3)

The forward markets tables show prices in the forward markets and the intermonth spreads between the different monthly prices. They also show various exchange of futures for physicals prices and exchanges for swaps prices. Various short-term swap price tables are shown. The section also contains pricing components that are used to calculate other *Argus* price assessments.

21-day North Sea London Singapore close

The 21-day North Sea table for Singapore close shows prices for four months forward in the forward North Sea market at 4:30pm

Singapore time. This market is the 21-day Brent forward market (with Forties, Oseberg or Ekofisk substitutionality). It is called 21-day North Sea in *Argus Crude* to differentiate it from the 15-day Brent forward market that it replaced. This forward market trades in parallel to the Ice futures market in Brent as an over-the-counter market in Brent.

The contract trades at fixed prices and also in the form of intermonth spreads. *Argus* assesses the prices for the forward North Sea months by applying the intermonth spread assessments to the first-month North Sea forward price. *Argus* uses the EFP differential and the front-month Ice Brent futures to assess first-month forward North Sea, including expiry day, except for the last three sessions in the life of the front-month futures contract. On these sessions, *Argus* uses second-month Ice Brent futures and the corresponding EFP differential (*see Calculating North Sea Dated*).

21-day North Sea London close

The forward 21-day North Sea London close table duplicates the Dated price and also shows prices for four months forward in the forward 21-day North Sea market at 4:30pm London time. This market is the 21-day Brent forward market (with Forties, Oseberg or Ekofisk substitutionality). It is called 21-day North Sea in *Argus Crude* to differentiate it from the 15-day Brent forward market that it replaced. This forward market trades in parallel to the Ice futures market in Brent as an over-the-counter market in Brent. A weighted average of trade on the most liquid forward 21-day North Sea month is also the forward (or flat price) used in the calculation of the Dated assessment.

The forward 21-day North Sea market trades at fixed prices and also in the form of intermonth spreads. *Argus* assesses the price levels for these intermonth trades in the forward intermonths table on page 4 and uses these intermonth assessments to construct the fixed forward price assessments in the 21-day North Sea table.

Dubai Singapore close

Argus quotes forward Dubai for four months forward at 4:30pm Singapore time. A more detailed explanation of the *Argus* Dubai methodology can be found in the Mideast Gulf section or in the *Argus* document *Argus' Dubai Assessment Methodology* (contact *Argus* for more details).

The components used in the calculation of the forward Dubai prices are the Dubai/Ice Brent EFS differentials, which *Argus* quotes for three months forward, and the Dubai Intermonths, which *Argus* quotes for three periods forward.

Dubai London close

Argus quotes the forward Dubai price for four months forward. These prices are assessed at London 4:30pm and so differ from the Singapore 4:30pm assessments.

Dated to Ice Brent frontline

Argus quotes prices for the Dated to Frontline (DFL) market which trades the difference between the Dated assessment and the frontline Ice assessment. *Argus* quotes this market for three months forward, two quarters and one year forward.

WTI Cushing

WTI is assessed on a cash market basis at 2:15pm Houston time. These prices reflect an intelligent assessment of the bid/ask range at the time stamp. Cash WTI rolls on the fourth business day following the expiry of the front-month Nymex Light Sweet crude futures contract.

North Sea (*Argus Crude* page 4)

The North Sea crude market is one of the most important oil markets in the world. For many years, the main North Sea crude price was the price of Brent Blend. This was the main price benchmark against which other crudes were valued. In addition to trading physical cargoes, and having other physical grades price against it, the Brent market developed a forward market and also a series of derivative markets, such as short-term contract for differences and long-term swaps. The Brent market is also the underlying market to London-based IntercontinentalExchange's Ice Brent futures contract.

But there was a problem with the Brent Blend benchmark. Production of Brent crude is in decline and the number of freely available cargoes for trade is declining even more rapidly. This means that the benchmark did not always reflect the consensus view of the prevailing market. Consequently, *Argus* developed the concept of a generic North Sea benchmark which involved broadening the base of liquidity that underpins the benchmark. The generic North Sea benchmarks in *Argus Crude* evolved over time — from the *Argus* North Sea Index to the *Argus* North Sea Reference Price — but eventually the generic benchmark became *Argus* North Sea Dated, a price derived from a methodology that involved four grades, Brent, Forties, Oseberg and Ekofisk. This price became known as Dated or North Sea Dated.

Calculating North Sea Dated

Argus North Sea Dated is the market's implied value for the North Sea Dated price reference obtained by cross referencing forward trade, CFD trade and physical differentials for the four BFOE crudes within the 10-21 day assessment period.

The building block from which the North Sea Dated assessment is derived is called the "flat" price or "forward" price. It is the price for Brent crude for loading in one (or possibly two) months time.

The forward price is the price for a 21-day North Sea contract (Brent with Forties, Oseberg or Ekofisk substitutionality), a contract that trades forward in monthly delivery periods but which will mature into a physical obligation 21 days in advance of the cargo date nomination. *Argus* identifies the "flat" price from a volume weighted average of 21-day North Sea trade (partial and full cargo) reported to *Argus* as having transacted between 4:29 and 4:30pm London time. In the event of there being less than 100,000 bls of 21-day traded in the time period *Argus* will establish the flat price as a function of the value of an exchange of futures for physical contract (EFP) and the prevailing IntercontinentalExchange's Brent futures price.

If *Argus* assesses the flat price of the forward 21-day contracts using an exchange of futures for physical (EFP) differential and a representative Ice Brent futures value then the EFP is assessed throughout the day and the Ice value will usually be the Ice 1 minute marker. The Ice 1 minute marker based on trade at 4:29 - 4:30pm London time is assumed to be a representative value for the futures contract unless *Argus* deems otherwise. *Argus* will deem it otherwise if the Ice 1 minute marker does not appear to be a representative value. When *Argus* uses the the EFP to assess the flat price *Argus* uses the EFP differential and the front-month Ice Brent futures. In the last three sessions in the life of the front-month futures contract *Argus* uses second-month Ice Brent futures and the corresponding EFP differential.

A full roll date calendar is available on www.argusmedia.com

The North Sea crude prices used in the Dated methodology are assessed either against the anticipated value of Dated or against the flat (forward) price depending on which formulas are under discussion by the market. The market often uses the anticipated Dated value as a reference because it is common that crude grades will price against the value of Dated at the date of loading. The market anticipates the value of Dated, for risk management purposes, by trading contracts for difference (CFDs) between the forward price and the anticipated value of Dated. *Argus* can construct the market's perceived value of Dated several weeks forward from these CFD prices. *Argus* uses these CFD values to publish an Anticipated Dated value which is an average of the prices 10-21 days forward as anticipated by the market for Dated.

Prices for the four leading grades of North Sea crude, Brent, Forties, Oseberg and Ekofisk, are valued either against the forward (or flat) price of Brent or against the anticipated Dated value at the time of loading. *Argus* will use one or both of these sets of differentials to construct the prices for Brent, Forties, Oseberg and Ekofisk in the 10-21 days forward period. An average of the prices in the 10-21 days forward period for each of these four crudes is used to determine the value of Dated. These averages comprise the Brent, Forties, Oseberg and Ekofisk components in the *Argus* Dated methodology. The lowest of these four values sets the Dated price. The 10-21 day average is determined by industry convention.

This methodological approach used by *Argus* is also utilised by all active participants in the North Sea market to identify the value of Dated. *Argus* identifies the differentials, such as the prevailing EFP price, the CFD values and the differentials for the various grades of crude, through a telephone and electronic mail survey. A wide cross-section of companies are contacted daily and *Argus* attempts to establish some form of contact with all market participants.

Argus assesses the physical grade differential for each day of the 10-21 day assessment period for Brent, Forties, Oseberg and Ekofisk. *Argus* identifies the physical price differentials at 4:30pm for each loading date which has market depth at 4:30pm and will use information gathered throughout the day to make inferred price assessments for every other loading day of the 10-21 day assessment

Argus Dated Calculation

Today's date 14-May	CFDs		Anticipated Dated	Day	Date	Days forward	Brent Dated related	Brent Jul related	Brent	Forties Dated related	Forties Jul related	Forties	Oseberg Dated related	Oseberg Jul related	Oseberg	Ekofisk Dated related	Ekofisk Jul related	Ekofisk
21-day Jul 67.28 North Sea																		
Current CFD week 14-May 18-May																		
14-May	0.00		67.28	Mon	14-May	0												
15-May	0.00		67.28	Tue	15-May	1												
16-May			67.28	Wed	16-May	2												
17-May	0.00		67.28	Thu	17-May	3												
18-May	0.00		67.28	Fri	18-May	4												
1st CFD week 21-May 25-May						5												
21-May	-0.80		66.48	Mon	21-May	7												
22-May	-0.80		66.48	Tue	22-May	8												
23-May	-0.80		66.48	Wed	23-May	9												
24-May	-0.80	66.48	66.48	Thu	24-May	10	-0.30	66.18		-1.45	65.83		1.25	67.73		0.50	66.98	
25-May	-0.80	66.48	66.48	Fri	25-May	11	-0.30	66.18		-1.45	65.83		1.25	67.73		0.50	66.98	
2nd CFD week 28-May 01-Jun						13												
28-May	-0.70	66.58	66.58	Mon	28-May	14	-0.30	66.28		-1.20	66.08		1.25	67.83		0.50	67.08	
29-May	-0.70	66.58	66.58	Tue	29-May	15	-0.30	66.28		-1.20	66.08		1.25	67.83		0.50	67.08	
30-May	-0.70	66.58	66.58	Wed	30-May	16	-0.30	66.28		-1.20	66.08		1.25	67.83		0.50	67.08	
31-May	-0.70	66.58	66.58	Thu	31-May	17	-0.30	66.28		-1.20	66.08		1.25	67.83		0.85	67.43	
01-Jun	-0.70	66.58	66.58	Fri	01-Jun	18	-0.30	66.28		-1.20	66.08		1.25	67.83		0.85	67.43	
3rd CFD week 04-Jun 08-Jun						20												
04-Jun	-0.60	66.68	66.68	Mon	04-Jun	21	-0.30	66.38		-1.10	66.18		1.25	67.93		1.15	67.83	
05-Jun	-0.60		66.68	Tue	05-Jun	22												
06-Jun	-0.60		66.68	Wed	06-Jun	23												
07-Jun	-0.60		66.68	Thu	07-Jun	24												
08-Jun	-0.60		66.68	Fri	08-Jun	25												
4th CFD week 11-Jun 15-Jun						27												
11-Jun	-0.50		66.78	Mon	11-Jun	28												
12-Jun	-0.50		66.78	Tue	12-Jun	29												
13-Jun	-0.50		66.78	Wed	13-Jun	30												
14-Jun	-0.50		66.78	Thu	14-Jun	31												
15-Jun	-0.50		66.78	Fri	15-Jun	32												
Anticipated Dated average for 10-21 days forward		66.57 Jul 21-day -0.71	66.57				Dated Component Brent	66.27		Dated Component Forties	66.03		Dated Component Oseberg	67.82		Dated Component Ekofisk	67.24	

Argus North Sea Dated 66.03

period. The lowest average of the daily assessments for the four crudes in the North Sea Dated methodology will then set the North Sea Dated value.

Argus uses the *Argus* Dated Calculation spreadsheet (see page above) to construct the North Sea Dated assessment. The spreadsheet illustrates how *Argus* assesses prices for each of the Brent, Forties, Oseberg and Ekofisk crude grades on each individual working day in the 10-21 day assessment period. The spreadsheet shows how *Argus* takes into account market structure when transactions for loading dates in the 10-21 assessment period occur in close time proximity. An illustration of how the *Argus* North Sea Dated calculation is made can be found on the *Argus* website at www1.argusmedia.com/ArgusStaticContent//Meth/webbfo.pdf

Argus will ensure that confirmed market information will be placed on the *Argus* Crude Oil Bulletin Board during the day, and guarantees to do this in a timely manner between 3:30pm and 4:30pm London time.

Argus uses inferred price assessments based on information gathered throughout the day because there is insufficient market activity at 4:30pm to construct a bid/offer price for every grade for each loading day within the price assessment period. *Argus* does not rigidly use the highest bid at 4:30pm for a single loading date in the 10-21 assessment period to set the prices for all dates in this assessment period. Using highest bids for a single loading day may lever the entire 10-21 day assessment period in a manner that is not considered representative by the market. Neither does *Argus* weight the assessment according to transactions at any particular time during the day, nor does it average transactions to identify a price level for North Sea Dated.

The North Sea Dated assessment is the benchmark price against which other grades of crude oil are assessed in the Atlantic basin.

North Sea Assessments
See table below

Dated or North Sea Dated is set by the lowest of the Brent, Forties, Oseberg and Ekofisk components. Consequently it is not the price of a grade of crude but a benchmark established through a methodology. Therefore it has no API density or sulphur specification.

North Sea Assessments					
Grade	typical °API	typical Sulphur %	Basis/Location	Timing	Cargo size
Dated			fob Sullom Voe, Hound Point, Teesside, UK or Sture terminal	Loading 10-21 days ahead	600,000 bl
Brent	37.9	0.45	fob Sullom Voe	Loading 10-21 days ahead	600,000 bl
Forties	40.3	0.56	fob Hound Point, UK	Loading 10-21 days ahead	600,000 bl
Oseberg	37.8	0.27	fob Sture terminal	Loading 10-21 days ahead	600,000 bl
Ekofisk	37.5	0.23	fob Teesside, UK	Loading 10-21 days ahead	600,000 bl
Statfjord cif Rotterdam	39.1	0.22	cif Rotterdam	Loading 10-21 days ahead	855,000 bl
Statfjord fob platform	39.1	0.22	fob platform	Loading 10-21 days ahead	855,000 bl
Gullfaks cif Rotterdam	36.2	0.26	cif Rotterdam	Loading 10-21 days ahead	855,000 bl
Gullfaks fob platform	36.2	0.26	fob platform	Loading 10-21 days ahead	855,000 bl
Flotta	36 .9	0.82	fob Flotta terminal	Loading 10-21 days ahead	650,000 bl

The prices for the various grades of crude oil are established by adding the current Dated price to the current market differential for that grade of crude. *Argus* assesses the grade differentials during the course of the day with a cutoff time at 4:30pm London time. Formulas for Dated-related crudes are an indication of the differential to Dated around bill of lading assessed as achievable on the day of the report. *Argus* does not consider ship-to-ship transfers when assessing the grade differentials.

Argus also publishes the component values for Brent, Forties, Oseberg and Ekofisk that are used to calculate the price of Dated. It is the lowest of these four components that sets the price of Dated. The component values for these crudes are not necessarily the same as the prices for these crudes, as the grade prices are calculated by adding the market premium for the grade to the current Dated value.

The **Brent** assessment is the price of Brent Blend, a North Sea crude. The value of Brent is calculated by applying the market differential of Brent to the current Dated value. The prevailing market differential is also published separately.

The **Forties** assessment is the price of Forties Blend, a North Sea crude. The value of Forties is calculated by applying the market differential of Forties to the current Dated value. The prevailing market differential is also published separately.

The **Oseberg** assessment is the price of Oseberg, a North Sea crude. The value of Oseberg is calculated by aapplying the market differential of Oseberg to the current Dated value. The prevailing market differential is also published separately.

The **Ekofisk** assessment is the price of Ekofisk, a North Sea crude. The value of Ekofisk is calculated by applying the market differential of Ekofisk to the current Dated value. The prevailing market differential is also published separately.

The **Statfjord cif Rotterdam** assessment is the price of Statfjord, a North Sea crude. The value of Statfjord cif Rotterdam is calculated by applying the market differential of Statfjord cif Rotterdam to the current Dated value. The prevailing market differential is also published separately. Statfjord is an offshore crude loaded at the platform rather than at an onshore terminal.

The **Statfjord fob platform** assessment is the price of Statfjord, a North Sea crude. The value of Statfjord fob platform is calculated by applying the market differential of Statfjord fob platform to the current Dated value. The prevailing market differential is also published separately. No modifications are made to the prevailing premium or discount in respect of freight arrangements.

The **Gullfaks cif Rotterdam** assessment is the price of Gullfaks, a North Sea crude. The value of Gullfaks cif Rotterdam is calculated by applying the market differential of Gullfaks cif Rotterdam to the current Dated value. The prevailing market differential is also published separately. Gullfaks is an offshore crude loaded at the platform rather than at an onshore terminal.

The **Gullfaks fob platform** assessment is the price of Gullfaks, a North Sea crude. The value of Gullfaks fob platform is calculated by applying the market differential of Gullfaks fob platform to the current Dated value. The prevailing market differential is also published separately. No modifications are made to the prevailing premium or discount in respect of freight arrangements.

The **Flotta** assessment is the price of Flotta, a North Sea crude. The value of Flotta is calculated by applying the market differential of Flotta to the current Dated value. The prevailing market differential is also published separately.

North Sea EFP
Argus quotes the North Sea EFP, or the exchange of futures for physical price, which is the traded differential between the Ice Brent futures contract and the equivalent month 21-day North Sea forward price.

Ice Bwave
Argus also shows the Bwave price for three months forward. This is a weighted average of trade on the Ice Brent contract on the previous working day as calculated by the IntercontinentalExchange. It is used as a component in the Saudi Aramco formula for crude sales into Europe. *Argus* shows the Saudi Formula Base price which is derived from the Bwave that is the underlying price in its sales formula to European customers. The same formula is used by Kuwait and Iran in sales to European customers.

Ice minute markers
Argus shows the Ice 1 minute marker price which is a weighted average of trade on the Ice Brent contract between 4:29 and 4:30pm for two months forward as calculated by the IntercontinentalExchange.

Dated CFDs
Argus quotes prices for North Sea Dated CFDs, timestamped at 12:00pm and at 4:30pm London time. These are contracts for difference (or short-term swaps) for Dated against forward 21-day North Sea contracts. These North Sea Dated CFD prices are expressed as differentials to forward 21-day North Sea for four weekly periods forward.

Intermonths
The forward 21-day North Sea market rarely trades at fixed prices. Instead, most trade is in the form of intermonth trades. *Argus* assesses the price levels for these intermonth trades in the forward intermonths table and uses these intermonth assessments to construct the fixed forward price assessments in the 21-day North Sea table on page 3.

North Sea calculations
The North Sea calculations table shows how the component parts of Dated are used to derive the benchmark price.

North Sea basis (flat price) is a weighted average of forward 21-day North Sea trade in the minute leading up to 4:30pm London time. In the absence of reported trade, the Ice Brent minute marker and an EFP are used.

Anticipated Dated was previously called *Argus* Synthetic BFO. It is an average of the prices 10-21 days forward that are anticipated by the market for Dated as derived from the CFD market.

The **Brent, Forties, Oseberg and Ekofisk components** are the average prices 10-21 days forward using the *Argus* Dated methodology. The lowest of these components sets *Argus* Dated (*see Calculating North Sea Dated*).

Argus alternative Dated illustrations

Argus publishes a number of alternative Dated illustrations: ***Argus* Dated Average** (an average of the Brent, Forties, Oseberg and Ekofisk compenents), ***Argus* Dated BFOE** (currently equivalent to *Argus* North Sea Dated), (an average of the Brent, Forties, Oseberg and Ekofisk compenents), ***Argus* Dated BFO** (set by the lowest priced of the Brent, Forties and Oserberg components), and ***Argus* Dated FOE** (set by the lowest priced of the Forties, Oseberg and Ekofisk components).

Argus North Sea Reference Price

Argus also publishes a second North Sea generic price called the ***Argus* North Sea Reference Price**. This was a precursor to *Argus* Dated. The *Argus* North Sea Reference Price uses a forward curve similar to Anticipated Dated called Synthetic Brent.

The *Argus* North Sea Reference Price is based on a weighted average of adjusted North Sea crude assessments. The North Sea crude assessments are standardised using the *Argus* Synthetic Brent assessment, which is calculated from the market relevant *Argus* 21-day North Sea price adjusted by the average value of the second and third week CFD (contract for differences) value as published in *Argus Crude*. This average is weighted between the second and third week according to the number of working days in the second and third weeks that fall 15 to 19 days ahead of the current date. The weighted average of the North Sea crude assessments (Forties, Flotta, Ekofisk, Statfjord and Oseberg prices) used in the *Argus* North Sea Reference Price is composed of the following ratio:

	Ratio	Approx %
Forties	25	26.32
Flotta	5	5.26
Ekofisk	15	15.79
Oseberg	15	15.79
Statfjord	35	36.84

The assessments for these crudes are calculated by appying the differential of the market value of the crude against the *Argus* Synthetic Brent price.

The **Argus Synthetic Brent** assessment is calculated from the relevant *Argus* 21-day North Sea price adjusted by the average value of the second and third week CFD (contract for difference) value as published in *Argus Crude*. It is a component of the *Argus* North Sea Reference Price.

Russia-Caspian (*Argus Crude* page 6)

Argus assesses the price for a variety of Russian and Caspian crudes transported by ship to Rotterdam and Augusta, Italy, and by pipeline to central Europe. *Argus* also calculates netback values to the loading terminals for several crudes.

Argus uses an intelligent interpretation of prevailing market conditions to establish the assessment values.

Russian and Caspian crude prices are calculated using the differentials to the current Dated price. The methodology behind the Dated assessment can be found in the North Sea section and on the www.argusmedia.com. The grade differentials are assessed during the course of the day with a cut off at 5:30pm London time. The current differentials and current Dated assessments are added together to generate the grade assessment.

The Russian and Caspian cif price assessments are made by a telephone and electronic mail survey. A cross-section of buyers and sellers are consulted and the market information cross-referenced with active market participants. A consensus value regarding the crude grade differential is then determined and used to generate the price of the crude.
Urals (Russian Export Blend) cif assessments assume an EU-standard double-hulled vessel.

The timing of the price assessments varies according to quotation. Check the Assessments table on page 8 for each assessment's timing period.

The Druzhba prices are assessed for Russian export blend at first point of export for delivery at various locations along the Druzhba (Friendship) pipeline. The prices are for 30,000 tonne tranches and for balance of the month. The market survey is conducted among Russian producers, shippers and end-user refineries. In the event that the market takes on retrospective pricing, the assessment price is the perceived value of the differential that will eventually be agreed between the seller and buyer for the month's oil.

Russian-Caspian Assessments
See table on page 8

The **Urals NWE** assessment is the price of Urals, or Russian export blend crude. The value of Urals NWE is calculated by applying the market differential of Urals cif northwest Europe to the Dated value. The prevailing market differential is also published separately.

The **Urals fob Primorsk** netback is calculated from the price of Urals NWE, netted back to Primorsk. The Urals Primorsk fob netback is derived from the Urals cif northwest Europe assessment netted back for freight, insurance and ice/towage fees. The freight cost is for 100,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. The ice/towage fees are calculated in roubles/GT and converted into dollars/bl. Insurance costs are calculated as a percentage of the outright cif price. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. The netback

also does not include the additional fixed rate differential added for voyages within the Baltic and North Sea Sulphur Oxide Emissions Control Area (SECA) as mentioned by Worldscale. There is a "Rotterdam charge" of $1.01/t added to the freight cost, assuming standard cargo sizes of 100,000t and vessels with gross tonnage of 60,000GT. The conversion factor for tonnes into barrels is 7.26.

The **Urals Med 80,000t** assessment is the price of Urals, or Russian export blend crude. The value of Urals Med is calculated by applying the market differential of Urals cif Augusta to the current Dated value. The prevailing market differential is also published separately. The Urals cif Augusta assessment reflects the market price of 80,000t cargoes. Urals Mediterranean prices are "Novorossiysk quality", typically 31.8°API and 1.3pc sulphur.

The **Urals 80,000t fob Novorossiysk** netback is calculated from the price of Urals Med, netted back to Novorossiysk. The Urals Novorossiysk fob netback is derived from the Urals cif Mediterranean assessment netted back for freight, insurance and demurrage costs. The freight cost is for 80,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. Demurrage costs are assessed daily and multiplied by the number of days delay in both directions, north bound and south bound, in the Turkish Straits above two days. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. The conversion factor for tonnes into barrels is 7.26.

The **Urals Med 135,000t** assessment is the price of Urals, or Russian export blend crude. The value of Urals Med is calculated by applying the market differential of Urals cif Augusta to the current Dated value. The prevailing market differential is also published separately. The Urals cif Augusta assessment reflects the market price of 135,000t cargoes. Urals Mediterranean prices are "Novorossiysk quality", typically 31.8°API and 1.3pc sulphur.

The **Urals 135,000t fob Novorossiysk** netback is calculated from the price of Urals Med, netted back to Novorossiysk. The Urals Novorossiysk fob netback is derived from the Urals cif Mediterranean assessment netted back for freight, insurance and demurrage costs. The freight cost is for 135,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. Demurrage costs are assessed daily and multiplied by the number of days delay in both directions, north bound and south bound, in the Turkish Straits above two days. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. The conversion factor for tonnes into barrels is 7.26.

The **Siberian Light** assessment is the price of Siberian Light, a Russian export blend. The value of Siberian Light is calculated by applying the market differential of Siberian Light cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **CPC Blend** assessment is the price of CPC Blend, a Kazakh export blend. The value of CPC Blend is calculated by applying the market differential of CPC Blend cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **CPC Terminal** netback is calculated from the price of CPC Blend, netted back to the CPC terminal near Novorossiysk, adjusted for other costs. The CPC Terminal fob netback is derived from the CPC Blend cif Augusta assessment netted back for freight, insurance and demurrage costs. The freight cost is for 135,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. Demurrage costs are assessed daily and mul-

Russian-Caspian Assessments					
Grade	typical °API	typical Sulphur %	Basis/Location	Timing	Cargo size
Urals NWE	31.8	1.40	cif northwest Europe	Loading 10-21 days ahead	100,000t
Urals fob Primorsk	31.8	1.40	fob Primorsk, Baltic		100,000t
Urals Med 80,000t	31.8	1.30	cif Augusta, Italy	Loading 5-20 days ahead	80,000t
Urals fob 80,000t Novorossiysk	31.8	1.30	fob Novorossiysk, Black Sea		80,000t
Urals Med 135,000t	31.8	1.30	cif Augusta, Italy	Loading 5-20 days ahead	135,000t
Urals fob 135,000t Novorossiysk	31.8	1.30	fob Novorossiysk, Black Sea		135,000t
Siberian Light	35.4	0.58	cif Augusta, Italy	Loading 5-20 days ahead	75,000t
CPC Blend	44	0.54	cif Augusta, Italy	Loading 10-30 days ahead	80,000t -135,000t
CPC Terminal	44	0.54	fob CPC terminal, near Novorossiysk		135,000t
Kumkol	42	0.40	cif Augusta, Italy	Loading 10-30 days ahead	50,000t - 100,000t
Azeri Light	35	0.16	cif Augusta, Italy	Loading 10-25 days ahead	80,000t-135,000t
Azeri Light	35	0.14	fob Supsa		80,000t
BTC	36	0.13	cif Augusta, Italy	Loading 10-25 days ahead	80,000t-135,000t
BTC	36	0.13	fob Ceyhan	Loading 10-25 days ahead	80,000t
Tengiz	46.5	0.54	cif Augusta, Italy	Loading 10-30 days ahead	80,000t
Tengiz	46.5	0.54	fob Odessa		80,000t
Druzhba Czech Republic	31.7	1.40	fit Budkovce, Slovakia (for Czech delivery)	Delivered during balance of current month	30,000t tranche
Druzhba Slovakia	31.7	1.40	fit Budkovce, Slovakia (for Slovak delivery)	Delivered during balance of current month	30,000t tranche
Druzhba Hungary	31.7	1.40	fit Fenyeslitke, Hungary (for Hungarian delivery)	Delivered during balance of current month	30,000t tranche
Druzhba Poland	31.7	1.40	fit Adamowo, Poland (for Polish delivery)	Delivered during balance of current month	30,000t tranche
Druzhba Germany	31.7	1.40	fit Adamowo, Poland (for German delivery)	Delivered during balance of current month	30,000t tranche

tiplied by the number of days delay in both directions, north bound and south bound, in the Turkish Straits above two days. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. There is a CPC Terminal discount of $1.42/t on the freight cost, which is regularly adjusted. The conversion factor for tonnes into barrels is 7.81.

The **Kumkol** assessment is the price of Kumkol, a Kazakh crude. The value of Kumkol is calculated by applying the market differential of Kumkol cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **Azeri Light** assessment is the price of Azeri Light, a crude from Azerbaijan. The value of Azeri Light is calculated by applying the market differential of Azeri Light cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **Azeri Light** netback is calculated from the price of Azeri Light, netted back to Supsa, adjusted for other costs. The Azeri Light fob netback is derived from the Azeri Light cif Augusta assessment netted back for freight, insurance and demurrage costs. The freight cost is for 80,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. Demurrage costs are assessed daily and multiplied by the number of days delay in the Turkish Straits above two days. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. The conversion factor for tonnes into barrels is 7.41.

The **BTC** assessment is the price of BTC origin crude. BTC is the Baku-Tbilisi-Ceyhan pipeline which has its terminal at Ceyhan, Turkey. The value of the BTC crude is calculated by applying the market differential of BTC cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **BTC fob Ceyhan** quotation is an assessment but in the absence of strong trading indications will be based on a BTC fob netback derived from the BTC cif Augusta assessment netted back for freight and insurance costs. The freight cost will be for 80,000t vessels and will be assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. The conversion factor for tonnes into barrels is 7.45.

The **Tengiz** assessment is the price of Tengiz, a Kazakh crude. The value of Tengiz is calculated by applying the market differential of Tengiz cif Augusta to the current Dated value. The prevailing market differential is also published separately.

The **Tengiz** netback is calculated from the price of Tengiz, netted back to Odessa, adjusted for other costs. The Odessa fob netback is derived from the Tengiz cif Augusta assessment netted back for freight, insurance and demurrage costs. The freight cost is for 80,000t vessels and is assessed daily based on spot freight rates from the *Argus Freight* report. Insurance costs are calculated as a percentage of the outright cif price. Demurrage costs are assessed

daily and multiplied by the number of days delay in both directions, north bound and south bound, in the Turkish Straits above two days. The netback does not include transportation losses, ballast, port demurrage, commissions, bank loan expenses or market structure. The conversion factor for tonnes into barrels is 7.98.

The **Druzhba Czech Republic** assessment is the price of Russian Export Blend fit Budkovce for delivery to the Czech Republic along the Druzhba pipeline at first point of export. The value of Druzhba Czech Republic is calculated by applying the market differential of Druzhba Czech Republic to the current Dated value. The prevailing market differential is also published separately.

Monthly Druzhba prices: Term prices for crude on the Druzhba pipeline are derived retrospectively from monthly formula prices agreed between buyers and sellers to determine the differential to North Sea Dated. The monthly differentials emerge at the beginning of the following month. So the July differentials to Dated for Druzhba appear at the beginning of August. *Argus* assesses the average monthly differential to Dated for different locations on the Druzhba pipeline. These are combined with an average of Dated values over the appropriate month to give an outright price.

The **Druzhba Slovakia** assessment is the price of Russian Export Blend fit Budkovce for delivery to Slovakia along the Druzhba pipeline at first point of export. The value of Druzhba Slovakia is calculated by applying the market differential of Druzhba Slovakia to the current Dated value. The prevailing market differential is also published separately.

Monthly Druzhba prices: Term prices for crude on the Druzhba pipeline are derived retrospectively from monthly formula prices agreed between buyers and sellers to determine the differential to North Sea Dated. The monthly differentials emerge at the beginning of the following month. So the July differentials to Dated for Druzhba appear at the beginning of August. *Argus* assesses the average monthly differential to Dated for different locations on the Druzhba pipeline. These are combined with an average of Dated values over the appropriate month to give an outright price.

The **Druzhba Hungary** assessment is the price of Russian Export Blend fit Fenyeslitke for delivery to Hungary along the Druzhba pipeline at first point of export. The value of Druzhba Hungary is calculated by applying the market differential of Druzhba Hungary to the current Dated value. The prevailing market differential is also published separately.

Monthly Druzhba prices: Term prices for crude on the Druzhba pipeline are derived retrospectively from monthly formula prices agreed between buyers and sellers to determine the differential to North Sea Dated. The monthly differentials emerge at the beginning of the following month. So the July differentials to Dated for Druzhba appear at the beginning of August. *Argus* assesses the average monthly differential to Dated for different locations on the Druzhba pipeline. These are combined with an average of Dated values over the appropriate month to give an outright price.

The **Druzhba Poland** assessment is the price of Russian Export Blend fit Adamowo for delivery to Poland along the Druzhba pipeline at first point of export. The value of Druzhba Poland is calculated by applying the market differential of Druzhba Poland to the current Dated value. The prevailing market differential is also published separately.

Monthly Druzhba prices: Term prices for crude on the Druzhba pipeline are derived retrospectively from monthly formula prices agreed between buyers and sellers to determine the differential to North Sea Dated. The monthly differentials emerge at the beginning of the following month. So the July differentials to Dated for Druzhba appear at the beginning of August. *Argus* assesses the average monthly differential to Dated for different locations on the Druzhba pipeline. These are combined with an average of Dated values over the appropriate month to give an outright price.

The **Druzhba Germany** assessment is the price of Russian export blend fit Adamowo for delivery to Germany along the Druzhba pipeline at first point of export. The value of Druzhba Germany is calculated by applying the market differential of Druzhba Germany to the current Dated value. The prevailing market differential is also published separately.

Monthly Druzhba prices: Term prices for crude on the Druzhba pipeline are derived retrospectively from monthly formula prices agreed between buyers and sellers to determine the differential to North Sea Dated. The monthly differentials emerge at the beginning of the following month. So the July differentials to Dated for Druzhba appear at the beginning of August. *Argus* assesses the average monthly differential to Dated for different locations on the Druzhba pipeline. These are combined with an average of Dated values over the appropriate month to give an outright price.

Russia-Caspian retrospective assessments
These assessments are based on the publication date's North Sea Dated added to the average of the fob differentials published over the retrospective period during which cargoes for loading that day are likely to have traded. They give the approximate price that a cargo loading on the day of publication could be expected to achieve.
The **Urals fob Primorsk retrospective** assessment is based on the publication date's North Sea Dated added to the average of the Urals fob Primorsk differentials for working days in a 10-21 day period before the publication date.

The **Urals fob Novorossiysk (80kt) retrospective** assessment is based on the publication date's North Sea Dated added to the average of the Urals fob Novorossiysk differentials for working days in a 5-20 day period before the publication date.

The **CPC Blend fob CPC Terminal retrospective** assessment is based on the publication date's North Sea Dated added to the average of the CPC Blend fob CPC Terminal differentials for working days in a 10-30 day period before the publication date.

Cif basis Singapore assessments
The **Urals Black Sea cif basis Singapore** assessment is calculated by adding a freight component to the Urals fob (135kt)

Novorossiysk netback. The freight cost is for 135,000t vessels and is assessed daily based on spot Med/Black Sea–East freight rates from the *Argus Freight report*.

The **BTC Blend cif basis Singapore** assessment is calculated by adding a freight component to the BTC fob Ceyhan assessment. The freight cost is for 135,000t vessels and is assessed daily based on spot Med/Black Sea–East freight rates from the *Argus Freight report.*

Mediterranean (*Argus Crude* page 8)

Argus assesses a variety of sweet and sour grades of crude in the Mediterranean. The crudes chosen are not only those for which there is open spot market activity but also those that allow price comparisons on sulphur and other specifications. The methodologies for each assessment are kept under regular review. In the absence of open market activity, *Argus* will use a comparative value approach, estimating the market value of the crude in line with other crudes that do have more price visibility. The published prices are not meant to be official selling prices. Official selling prices will also be published in *Argus Crude* and clearly labelled as such.
Mediterranean crude prices are calculated using the differentials to the current North Sea Dated price. The methodology behind the Dated assessment can be found in the North Sea section and on www.argusmedia.com. The grade differentials are assessed during the course of the day with a cut off time at 5:30pm London time. The current differentials and current Dated assessments are added together to generate the grade assessment.

The timing of the price assessments is for an average price in the period 10–25 days ahead except for Kirkuk which is for an average of 5-15 days ahead.

The Mediterranean fob price assessments are made by a telephone and electronic mail survey. A cross-section of buyers and sellers are consulted and the market information cross-referenced with active market participants. A consensus value regarding the crude grade differential is then determined and used to generate the price of the crude.

Mediterranean Assessments
See table below

Mediterranean Assessments					
Grade	typical °API	typical Sulphur %	Basis/ Location	Timing	Cargo size
Es Sider	36.2	0.49	fob Libya	Loading 10-25 days ahead	80,000t - 130,000t
Syrian Light	38.0	0.76	fob Syria	Loading 10-25 days ahead	80,000t - 130,000t
Iran Heavy	30.7	1.80	fob Sidi Kerir	Loading 10-25 days ahead	80,000t - 130,000t
Iran Light	33.7	1.50	fob Sidi Kerir	Loading 10-25 days ahead	80,000t - 130,000t
Suez Blend	30.4	1.65	fob Ras Shukeir	Loading 10-25 days ahead	80,000t - 130,000t
Saharan Blend	46.0	0.10	fob Arzew	Loading 15-35 days ahead	80,000t - 130,000t
Zarzaitine	42.8	0.06	fob La Skhirra	Loading 10-25 days ahead	80,000t - 130,000t
Basrah Light	30.0	2.00	fob Sidi Kerir	Loading 10-25 days ahead	80,000t - 130,000t
Kirkuk	36	2.00	fob Ceyhan	Loading 5-15 days ahead	80,000t - 130,000t

The value of **Es Sider,** a Libyan crude, fob Libya, is calculated by applying the market differential of Es Sider to the current Dated value. The prevailing market differential is also published separately.

The value of **Syrian Light**, a Syrian crude, fob Syria, is calculated by applying the market differential of Syrian Light to the current Dated value. The prevailing market differential is also published separately.

The value of **Iran Heavy,** Iranian crude, fob Sidi Kerir,, is calculated by applying the market differential of Es Sider to the current Dated value. The prevailing market differential is also published separately.

The value of **Iran Light**, an Iranian crude, fob Sidi Kerir, is assessed in relation to other quoted crude prices in the Mediterranean. The prevailing market differential to the Dated value is also published separately.

The value of **Suez Blend**, an Egyptian crude, fob Ras Shukeir, is assessed in relation to other quoted crude prices in the Mediter-ranean. The prevailing market differential to the Dated value is also published separately.

The value of **Saharan Blend**, an Algerian crude, fob Arzew, is calculated by applying the market differential of Saharan Blend to the current Dated value. The prevailing market differential is also published separately.

The value of **Zarzaitine**, an Algerian crude, fob Tunisia, is calculated by applying the market differential of Zarzaitine to the current Dated value. The prevailing market differential is also published separately.

The value of **Basrah Light**, an Iraqi crude, fob Sidi Kerir, is calcu-lated by applying the market differential of Basrah Light to the cur-rent Dated value. The prevailing market differential is also published separately.

The value of **Kirkuk**, an Iraqi crude, fob Ceyhan, is assessed in relation to other quoted crude prices in the Mediterranean. The prevailing market differential to the Dated value is also published separately.

Official formula prices

Argus also publishes official formula prices for crude from Algeria, Syria, Libya and Egypt. These are expressed as differentials to Dated or Urals in the Mediterranean for a given loading month and are set by national oil companies.

West Africa (*Argus Crude* page 9)

Argus assesses a variety of west African crudes. The crudes chosen are not only those for which there is open spot market activity but also those that allow price comparisons among the various grades. The methodologies for each assessment are kept under regular review. In the absence of open market activity, *Argus* will use a com-parative value approach, estimating the market value of the crude in line with other crudes that have more price visibility. The published

prices are not meant to be official selling prices. Official selling prices will also be published in *Argus Crude* and clearly labelled as such.

West African crude prices are calculated using the differentials to the current North Sea Dated price. The methodology behind the Dated assessment can be found in the North Sea section and on www.argusmedia.com. The grade differentials are assessed during the course of the day with a cut off time at 5:30pm London time. The current differentials and current Dated assessments are added together to generate the grade assessment. The timing of the price assessments is for an average price in the period 20-45 days ahead.

The west African price assessments are made by a telephone and electronic mail survey. A cross-section of buyers and sellers are consulted and the market information cross-referenced with active market participants. A consensus value regarding the crude grade differential is then determined and used to generate the price of the crude.

The formula price published represents the premium or discount to Dated around bill of lading assessed as achievable in the current market and used when establishing the quotation, except for Nigerian cargoes which are assessed five days after the bill of lad-ing (the same pricing basis used by NNPC).

West Africa Assessments

See table below

The value of **Bonny Light**, a Nigerian crude, is calculated by apply-ing the market differential of Bonny Light to the current Dated value. The prevailing market differential is also published separately.

The value of **Qua Iboe**, a Nigerian crude, is calculated by applying the market differential of Qua Iboe to the current Dated value. The prevailing market differential is also published separately.

West Africa Assessments					
Grade	typical °API	typical Sulphur %	Basis/Location	Timing	Cargo size
Bonny Light	34.5	0.14	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Qua Iboe	36.6	0.13	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Brass River	36.5	0.13	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Forcados	30	0.15	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Escravos	34	0.15	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Agbami	47.2	0.05	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Amenam	40.8	0.93	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Bonga	29.11	0.292	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Erha	33.7	0.1798	fob Nigeria	Loading 20-45 days ahead	950,000 bl
Cabinda	32.5	0.13	fob Angola	Loading 20-45 days ahead	950,000 bl
Girassol	31	0.33	fob Angola	Loading 20-45 days ahead	950,000 bl
Hungo	27.4	0.65	fob Angola	Loading 20-45 days ahead	950,000 bl
Nemba	38.7	0.19	fob Angola	Loading 20-45 days ahead	950,000 bl
Dalia	23.7	0.49	fob Angola	Loading 20-45 days ahead	950,000 bl
Kissanje	30.7	0.36	fob Angola	Loading 20-45 days ahead	950,000 bl
Zafiro	29.5	0.26	fob offshore Equatorial Guinea	Loading 20-45 days ahead	950,000 bl

The value of **Brass River,** a Nigerian crude, is calculated by applying the market differential of Brass River to the current Dated value. The prevailing market differential is also published separately.

The value of **Forcados,** a Nigerian crude, is calculated by applying the market differential of Forcados to the current Dated value. The prevailing market differential is also published separately.

The value of **Escravos**, a Nigerian crude, is calculated by applying the market differential of Escravos to the Dated value. The prevailing market differential is also published separately.

The value of **Agbami**, a Nigerian crude, is calculated by applying the market differential of Agbami to the current Dated value. The prevailing market differential is also published separately.

The value of **Amenam**, a Nigerian crude, is calculated by applying the market differential of Amenam to the current Dated value. The prevailing market differential is also published separately.

The value of **Bonga**, a Nigerian crude, is calculated by applying the market differential of Bonga to the current Dated value. The prevailing market differential is also published separately.
The value of **Erha**, a Nigerian crude, is calculated by applying the market differential of Erha to the current Dated value. The prevailing market differential is also published separately.

The value of **Cabinda**, an Angolan crude, is calculated by applying the market differential of Cabinda to the current Dated value. The prevailing market differential is also published separately.

The value of **Girassol**, an Angolan crude, is calculated by applying the market differential of Girassol to the current Dated value. The prevailing market differential is also published separately.

The value of **Hungo**, an Angolan crude, is calculated by applying the market differential of Hungo to the current Dated value. The prevailing market differential is also published separately.

The value of **Nemba**, an Angolan crude, is calculated by applying the market differential of Nemba to the current Dated value. The prevailing market differential is also published separately.

The value of **Dalia**, an Angolan crude, is calculated by applying the market differential of Dalia to the current Dated value. The prevailing market differential is also published separately.

The value of **Kissanje**, an Angolan crude, is calculated by applying the market differential of Dalia to the current Dated value. The prevailing market differential is also published separately.

The value of **Zafiro**, a crude from Equatorial Guinea, is calculated by applying the market differential of Zafiro to the current Dated value. The prevailing market differential is also published separately.

Nigerian official formula prices
Argus also publishes official formula prices for crude from Nigeria.

These are expressed as differentials to Dated for a given loading month and are set by Nigeria's national oil company NNPC.

Mideast Gulf (*Argus Crude* page 10)

The Dubai price is a leading benchmark for crude pricing. It is the benchmark for most of the sour crude exported from the Gulf to the east of Suez markets. Middle East crude oil sold to the eastern markets is traditionally valued against the price of Dubai or an average of the prices of Dubai and Oman. This is because Dubai is one of the few Middle Eastern crudes to be sold without extensive destination clauses and is available to a freely traded open spot market. Dubai's production, and therefore its market liquidity, has been in decline for many years. Few full cargoes of Dubai crude are now traded on the open spot market which means price discovery of the crude needs to reflect other transparent and liquid market indicators. *Argus* Dubai prices are identified through a swaps and spreads methodology.

Mideast Gulf Assessments
See table below

Dubai
Argus assesses the price of Dubai in the same way that the market assesses the value of Dubai. Companies that trade the Dubai market convert their Dubai price exposure into a Brent price exposure. They do this because Brent price exposure is more easy to manage. The underlying traded volumes of Dubai swaps and the associated Ice Brent contract provide a more reliable and transparent basis for assessing the price of Dubai than any other methodological approach.

Argus begins its assessment of the Dubai price by reporting the active market in Dubai swaps based in Singapore. Dubai swaps are traded as an exchange of futures for swaps (EFS). *Argus* identifies and reports the prevailing EFS price, expressed as a differential to the Ice Brent price. This EFS value is subtracted from the prevailing price of Brent on the Ice at 4:30pm Singapore time to establish a fixed price for Dubai swaps.

Argus identifies the EFS value for the first three months forward. Applying these differentials to the first three months of the Ice Brent price provides *Argus* with absolute values for the first three months of the Dubai swaps market.

Dubai crude that is traded today is not loaded or priced for two months, so the first-month swap price is the market's value of Dubai

Mideast Gulf Assessments					
Grade	typical °API	typical Sulphur %	Basis/Location	Timing	Cargo size
Dubai	31	2.04	fob Dubai	Month of loading	400,000 bl
Murban	40.4	0.79	fob UAE	Month of loading	500,000 bl
Lower Zakum	39.2	1.10	fob UAE	Month of loading	500,000 bl
Oman	33.3	1.06	fob Oman	Month of loading	500,000 bl
Qatar Land	41.1	1.22	fob Qatar	Month of loading	500,000 bl
Qatar Marine	36.2	1.60	fob Qatar	Month of loading	500,000 bl
Al-Shaheen	30.3	1.9	fob Qatar	Month of loading	600,000 bl
Banoco A M	31.8	2.45	fob Bahrain	Month of loading	500,000 bl

in three months time. The first-month Dubai swap price is therefore the same as the third-month Dubai forward price. This third-month forward price is then used to derive the physical Dubai price.
To derive the physical Dubai price, *Argus* assesses the Dubai inter-month spreads. There is an active intermonth Dubai spread market based in Singapore and London. Identifying the spread value between the third and the second month and also the second and the first month allows *Argus* to calculate the value of first-month Dubai.

In the event that the first to second month spread is so illiquid that a price cannot be established, *Argus* will use other market information, such as price indications for physical Dubai. These indications would normally be for south Asian destinations and expressed as a premium to the anticipated published Dubai price. *Argus* will make an intelligent assessment based on such market information as is available to establish a value for first-month Dubai.

Argus can verify the market perception of the value of Dubai by analysing other key market differentials such as the Brent-Dubai spread, forward Brent prices and the market for exchange for physical (EFP) contracts in Brent.

Argus does not use partial Dubai to set its Dubai price assessments. Oman substitutionality into Dubai is not relevant in a swaps and spreads approach to price discovery.
The following table provides an example of the *Argus* assessment process for Dubai forward months:

Dubai forward month calculator			
Ice Brent month 1	Dec		87.34
Dubai EFS month 1	Dec	-	3.95
Dubai swap month 1*	Dec	=	83.39
Dubai forward month 3*	Feb	=	83.39
Dubai intermonth	Jan/Feb	+	-1.45
Dubai forward month 2	Jan	=	81.94
Dubai intermonth	Dec/Jan	+	-0.95
Dubai forward month 1	Dec	=	80.99
Dubai swap month 1 = Dubai forward month 3			

Oman

Argus assesses the price of Oman in the same way that most of the market assesses the value of Oman, by interpreting the value of Oman compared with Dubai. Since the Oman government began setting the OSP for Oman crude in line with the monthly average of Oman futures traded on the Dubai Mercantile Exchange (DME) the over-the-counter spot trade of Oman has been priced in a variety of ways. *Argus* uses market premiums for full cargoes of spot Oman on a Dubai or a MOG basis to calculate its physical Oman price assessment.

For example: In the first half of October, *Argus* will assess front-month Oman as follows: December Oman equals the anticipated price of Dubai physical cargoes in December plus the market premium or discount of Oman.

Argus uses the openly traded swaps and spreads in the Dubai market to assess the price of Dubai. As a result, *Argus* does not have to use Oman substitutionality into Dubai.

The following table provides examples of the inputs *Argus* uses to calculate Oman forward months:

Oman forward month calculator					
	MOG formula	Dubai-Oman spread	Diff to Dubai swaps	Dubai swaps outright	Oman forward midpoint
Dec	+0.07	-2.47	-2.40	83.39	80.99
Jan	+0.07	-0.07	+0.00	84.64	84.64
Feb	+0.07	-0.07	+0.00	85.61	85.61

Murban and Lower Zakum

Argus assesses the price of Murban and Lower Zakum in the same way that most of the market assesses the values of Murban and Lower Zakum, by interpreting the values of Murban and Lower Zakum compared with Dubai.

Argus assesses the prices of Murban and Lower Zakum using the price of Dubai modified by the market's differences between Dubai and the Murban and Lower Zakum official prices plus the prevailing premium (or discount) for Murban and Lower Zakum as currently traded.
In more detail, *Argus* will assess front-month Murban and Lower Zakum as follows: Front-month Dubai swap prices plus the difference between last month's OSP and last month's average Dubai plus the *Argus* assessment of the spot premium (or discount) for Murban and Lower Zakum versus the OSP.

For the last three days in any month, *Argus* will not use the difference between last month's OSP and last month's average Dubai but will substitute the difference between a forecast for the next OSP and current front-month Dubai swaps.

For example: October Murban equals October Dubai swaps plus (September OSP less September Dubai front-month swaps average) plus the market premium or discount of the grade.

These assessments reflect cargoes loading two months from the date of publication.

Qatar Land and Qatar Marine

Argus assesses the price of Qatar Land and Qatar Marine in the same way that most of the market assesses the values of Qatar Land and Qatar Marine, by interpreting the values of Qatar Land and Qatar Marine compared with Dubai.

Argus assesses the prices of Qatar Land and Qatar Marine using the price of Dubai modified by the market's differences between Dubai and the Qatar Land and Qatar Marine official prices plus the prevailing premium (or discount) for Qatar Land and Qatar Marine as currently traded.

In more detail, *Argus* will assess front-month Qatar Land and Qatar Marine as follows: Front-month Dubai swap prices plus the difference between last month's OSP and last month's Dubai OSP plus the *Argus* assessment of the spot premium (or discount) for Qatar Land and Qatar Marine versus the OSP.

For example: October Qatar Land equals October Dubai swaps

plus expected OSP adjustment (September OSP less September Dubai OSP) plus market differential.

These assessments reflect cargoes loading two months from the date of publication.

Al-Shaheen

The **Al-Shaheen** assessment is the price of Al-Shaheen, a crude from Qatar. The value of Al-Shaheen is calculated by applying the market differential of Al-Shaheen fob Qatar to Dubai swaps for the month of loading. The prevailing market differential is also published separately.

This assessment reflects cargoes loading two months from the date of publication.

Banoco Arab Medium

Argus assesses the price of Banoco Arab Medium in the same way that most of the market assesses the value of Banoco Arab Medium, by interpreting the value of Banoco Arab Medium compared with the average of Dubai and Oman.
Argus assesses the price of Banoco Arab Medium using the average price of Dubai and Oman modified by the market's differences between the average of Dubai and Oman with the anticipated Banoco Arab Medium official price (based on the previous OSP set by Saudi Aramco for Arab Medium) plus the prevailing premium (or discount) for Banoco Arab Medium as currently traded.

In more detail, *Argus* will assess front-month Banoco Arab Medium as follows: The average of front-month Dubai swaps plus the difference between the Dubai Oman average with the most recent Saudi Aramco OSP for Arab Medium plus the *Argus* assessment of the spot premium (or discount) for Banoco Arab Medium versus the Saudi OSP for Arab Medium.

For example: October Banoco Arab Medium equals the average of October Dubai swaps plus the difference between the Dubai Oman average and the Saudi OSP, plus the market differential for the grade. This assessment reflects cargoes loading two months from the date of publication.

Dubai forward

Argus assesses physical Dubai four months forward including the front month. Front-month physical Dubai is for cargoes loading two months from date of publication. For example, on 15 August, the front month is October. The forward months assessed are November, December and January. On 1 September, the front month will be November with forward assessments for December, January and February.

Argus assesses the prices of Middle East crude at 4:30pm Singapore time. *Argus* assessments of Middle East crude reflect cargo volumes of 400,000 bl for Dubai and 500,000 bl for other grades. *Argus* assesses physical Oman three months forward. For example, on 15 August, *Argus* will assess October, November and December Oman.

The rollover of Middle East crude assessments to the next forward month will take place on the first calendar day of the month unless it falls on a weekend or holiday, when it will shift to the first business day of the month.

Argus assesses the bid/ask range on Dubai EFS at 4:30pm Singapore time for three calendar months. For example, on 15 August, *Argus* will assess the October, November and December Dubai EFS. The rollover of Dubai swaps to the next forward month will take place on the first calendar day of the month or, in case of weekend or holiday, on the first business day of the month.

Asia-Pacific (*Argus Crude* page 11)

Argus assesses the price for a variety of Asia-Pacific crude grades. *Argus* uses an intelligent interpretation of prevailing market conditions to establish the assessment values.

Argus assessments of Asia-Pacific crudes consist of a fixed-price or formula assessment and a differential assessment. All of these price assessments are made with a cut off of 4:30pm Singapore time, with the exception of those grades assessed on a North Sea Dated basis.

For those grades assessed relative to North Sea Dated, the differentials are assessed with a cut off of 4.30pm Singapore time, while the underlying North Sea Dated price is assessed at 4.30pm London time. The methodology behind the Dated assessment can be found in the North Sea section and on www.argusmedia.com.

Asia-Pacific Assessments

See table below

Asia-Pacific, Sudan, ESPO Blend and Sakhalin Island Assessments					
Grade	typical °API	typical Sulphur %	Basis/ Location	Timing	Cargo size
Minas	35	0.08	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Duri	21.5	0.20	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Cinta	32.7	0.12	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Widuri	33.3	0.07	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Senipah	51	0.03	fob Indonesia	Loading 15-45 days ahead	250,000 bl
Attaka	43	0.09	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Ardjuna	37	0.09	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Belida	45	0.02	fob Indonesia	Loading 15-45 days ahead	100,000 - 200,000 bl
Bach Ho	39	0.04	fob Vietnam	Loading 15-45 days ahead	450,000 - 600,000 bl
Sutu Den	35.8	0.051	fob Vietnam	Loading 15-45 days ahead	450,000 - 600,000 bl
Tapis	46	0.02	fob Malaysia	Loading 15-45 days ahead	450,000 - 600,000 bl
Labuan	29.92	0.028	fob Malaysia	Loading 15-45 days ahead	300,000 - 600,000 bl
Kikeh	36.74	0.06	fob Malaysia	Loading 15-45 days ahead	600,000 bl
Kutubu Light	45	0.04	fob Papua New Guinea	Loading 30-60 days ahead	500,000 - 650,000 bl
Cossack	48	0.04	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
NW Shelf	60	0.01	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
Enfield	22	0.12	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
Stybarrow	22.7	0.117	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
Vincent	18.5	0.55	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
Pyrenees	19	0.21	fob Australia	Loading 30-60 days ahead	400,000 - 450,000 bl
Van Gogh	17	0.37	fob Australia	Loading 30-60 days ahead	500,000 - 650,000 bl
Nile Blend	32.76	0.045	fob Bashayer, Sudan	Loading 15-45 days ahead	600,000 - 1mn bl
Dar Blend	26.4	0.116	fob Bashayer, Sudan	Loading 15-45 days ahead	600,000 - 1mn bl
ESPO Blend	34	0.6	fob Kozmino	Loading 30-75 days ahead	700,000 bl
Sokol	37.9	0.23	cif northeast Asia	Month of loading	700,000 bl
Vityaz	38	0.18	cif Yosu	Month of loading	700,000 bl

Indonesia

Argus publishes assessments for Indonesian grades based on spot deals and market information for cargoes loading 15-45 days from the publication date.

The final price of **Minas** is assessed by taking the market consensus view of the Minas spread to Ice Brent futures or to North Sea Dated. In addition to this final price, *Argus* also shows the current market premium/discount for Minas to the Indonesian Crude Price (ICP). The Minas base price is the price left when this market premium/discount is removed from the final Minas price.

The **Duri** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Duri ICP and activity on grades of similar quality.

The **Cinta** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Cinta ICP and activity on grades of similar quality.

The **Widuri** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Widuri ICP and activity on grades of similar quality.

The **Senipah** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Senipah ICP and activity on grades of similar quality.

The **Attaka** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Attaka ICP and activity on grades of similar quality.

The **Ardjuna** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Ardjuna ICP and activity on grades of similar quality.

The **Belida** assessment is based on the market consensus of the spread between the grade and Minas. In the absence of specific market discussion, *Argus* will take into account the spread between the Minas and Belida ICP and activity on grades of similar quality.

Malaysia

Argus publishes assessments for Malaysian grades based on spot deals and market information for cargoes loading 15-45 days from the publication date.

The **Tapis** assessment is the sum of the grade's current spot premium to Tapis APPI and to the forward price for Tapis derived from *Argus*' Tapis forward curve.

Argus makes use of either fixed-price discussion or the Ice Brent to Tapis EFS (exchange of futures for swaps) market, with Ice Brent prices assessed at 4:30pm Singapore time, to derive a forward price for Tapis.

The Tapis forward market is quoted for four calendar months and for two consecutive calendar quarters. The monthly and quarterly assessments will roll on the first working day of each month. The forward prices are assessed after a telephone, instant messenger and electronic mail survey of market participants.

The **Kikeh** assessment is the sum of the grade's current spot premiums to Tapis APPI and the prices 30 days forward for Tapis derived from *Argus*' Tapis forward curve.

The **Labuan** assessment is the sum of the grade's current spot premiums to Tapis APPI and the prices 30 days forward for Tapis derived from *Argus*' Tapis forward curve.

Vietnam

Argus publishes assessments for Vietnamese grades based on spot deals and market information for cargoes loading 15-45 days from the publication date.

For **Bach Ho**, Vietnam sets an official selling price (OSP), which sets out the premium that Bach Ho lifters will pay to the anticipated price of Minas crude. *Argus* assesses Bach Ho by applying this Vietnamese OSP to the current Minas base price (see Indonesia section above) and then applying the grade's current spot market differential, as heard in the market.

For example: if the Vietnamese Bach Ho OSP is +$4.00/bl; the Minas base price is $50/bl; and the spot market premium for Bach Ho is -$2.00/bl, then *Argus* would assess Bach Ho at $52/bl.

The **Sutu Den** assessment is the sum of the Minas base price and the grade's current spot market premium/discount to Minas.

Australia and PNG

Argus publishes assessments for Australian and PNG grades based on spot deals and market information for cargoes loading 30-60 days from the publication date.

PNG's **Kutubu Light** is assessed by adding the grade's current spot premium/discount to Tapis APPI to the prevailing Tapis price 45 days forward as derived from *Argus*' Tapis forward curve (see Malaysia section above for further details).

For example: if a Kutubu Light cargo loading 30-60 days from publication date is traded, bid or offered at a 10¢/bl discount to Tapis, *Argus* will apply the discount to the value of paper Tapis corresponding to the pricing period (45 days forward) in order to calculate the Kutubu Light price. If the value of the paper Tapis market around the pricing period is $70/bl, then the fixed price assessment for Kutubu Light on that day will be $69.90/bl.

The **Cossack** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is

assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology). In the absence of specific market discussion, *Argus* will also take into account the spread between the Tapis APPI-linked Cossack price and North Sea Dated.

The **Northwest Shelf** condensate assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Enfield** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Stybarrow** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Vincent** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Van Gogh** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, Argus will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Pyrenees** assessment is calculated by applying the grade's differential relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated,

which becomes available after 4:30pm London time. On days when North Sea Dated is unavailable due to a UK public holiday, Argus will use a substitute North Sea Dated price (see below for the relevant methodology).

Sudan

Argus assessments of Sudanese crudes consist of a market differential to North Sea Dated and an outright price calculated by applying the differential to North Sea Dated.

Argus will publish assessments for Sudanese grades based on spot deals and market information for 600,000-1mn bl cargoes loading 15-45 days from the publication date. The cut off time for Sudanese assessments is 4:30pm Singapore time.

The **Nile Blend** assessment is calculated by applying the differential of Nile Blend relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time.

On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

The **Dar Blend** assessment is calculated by applying the differential of Dar Blend relative to North Sea Dated based on a market consensus to the same day's North Sea Dated value. The differential is assessed with a cut off of 4:30pm Singapore time and applied to North Sea Dated, which becomes available after 4:30pm London time.

On days when North Sea Dated is unavailable due to a UK public holiday, *Argus* will use a substitute North Sea Dated price (see below for the relevant methodology).

ESPO Blend
See table on page 14

The **ESPO Blend** assessment is the price of crude from the East Siberia-Pacific Ocean (ESPO) pipeline, loading at Kozmino in the Russia Far East. The outright price of ESPO Blend is calculated by applying the rolling average market differential of ESPO Blend fob Kozmino to the Dubai price assessment for the month of loading, adjusted for inter-month Dubai spreads according to the published Dubai basis month.

The rolling average market differential is calculated on the basis of prices for cargoes traded within one loading programme up until the last cargo of the loading programme is traded.

The Argus assessment of ESPO Blend reflects the market price of 700,000 bl cargoes loading 30-75 days ahead of the publication date. The cut off time for ESPO Blend assessments is 4:30pm Singapore time. The prevailing average volume-weighted market differential is published separately.

Sakhalin Island

Argus assessments of crudes from Sakhalin Island in Russia consist of a market differential to Dubai swaps for the month of loading and an outright price calculated by applying the differential to Dubai swaps for the month of loading. *Argus* will publish assessments for Sakhalin grades based on spot deals and market information for 700,000 bl cargoes loading two months ahead of the publication date. The cut off time for Sakhalin Island assessments is 4:30pm Singapore time.

Sakhalin Island Assessments

See table on page 14

The **Sokol** assessment is the price of Sokol, a crude from Sakhalin Island in Russia. The value of Sokol is calculated by applying the market differential of Sokol cif northeast Asia to Dubai swaps for the month of loading. The prevailing market differential is also published separately.

The **Vityaz** assessment is the price of Vityaz, a crude from Sakhalin Island in Russia. The value of Vityaz is calculated by applying the market differential of Vityaz cif Yosu to Dubai swaps for the month of loading. The prevailing market differential is also published separately.

The cut off time for the Sakhalin Island assessments is 4:30pm Singapore time.

Substitute Dated

Substitute Dated replaces North Sea Dated as the base price for Cossack, Northwest Shelf condensate, Stybarrow, Enfield, Vincent, Nile Blend and Dar Blend on the few days each year when the Asian crude oil markets are operating, but a public holiday in the UK means that London will not produce a North Sea Dated price.

Substitute Dated is calculated at 4.30pm Singapore time. Substitute Dated comprises the Ice Brent 4.30pm Singapore one-minute marker plus or minus a differential representing the difference between the Brent futures market and the physical North Sea market.

This differential is calculated in the following manner: *Argus* takes the most recently available North Sea Dated price assessed in London, then it subtracts the London Ice Brent one-minute marker from that same day.

For example: Dated on 24 December was $72/bl and the Ice Brent 4.30pm London one-minute marker was $70/bl – a difference of $2/bl. To calculate Substitute Dated on 26 December, when Singapore is working but London is not, *Argus* will add this $2/bl difference to the Ice Brent 4.30pm Singapore one-minute marker ($69/bl) to give a Substitute Dated price of $71/bl.

The market differentials for Northwest Shelf condensate, Stybarrow, Enfield, Nile Blend and Dar Blend will then be added to this Substitute Dated price in line with their respective methodologies.

Official formula prices (*Argus Crude* page 12)

Argus publishes official formula prices for crude from Saudi Arabia, Iran, Yemen, Kuwait, Iraq and Dubai. These are expressed as differentials to various benchmarks for a given loading month and are set by national oil companies.

Official selling prices (*Argus Crude* page 12)

Argus publishes official selling prices for crude from Abu Dhabi, Qatar, Oman, Indonesia, Malaysia and Brunei. These are expressed as outright prices for a given loading month and are set by national oil companies.

Reference prices (*Argus Crude* page 12)

Argus publishes the Opec Reference Basket monthly average price and also the Japanese Crude Cocktail import basket price.

Americas (*Argus Crude* pages 13-19)

Americas assessments

Prices for the following crude grades are listed in *Argus Crude*, along with daily market commentary. Coverage includes US Gulf coast and midcontinent, US west coast, Canada, and Latin America. A complete methodology for each of these crude prices can be found in the methodology document for *Argus Americas Crude* which can be located here.

West Texas Intermediate (WTI)

Grade	API Gravity	% Sulphur	Basis	Low/High Minimum Volume	VWA Aggregate Volume Minimum
WTI Cash Cushing	39.0	0.40	Cushing, OK	1,000 b/d	1,000 b/d
WTI CMA	39.0	0.40	Cushing, OK	1,000 b/d	1,000 b/d
WTI Midland	39.0	0.40	Midland, TX	1,000 b/d	1,000 b/d
WTI P-Plus	39.0	0.40	Cushing, OK	500 b/d	1,000 b/d

US Gulf Coast

Grade	API Gravity	% Sulphur	Basis	Low/High Minimum Volume	VWA Aggregate Volume Minimum
Bonito	33.7	1.02	fob St. James, LA	500 b/d	1,000 b/d
Eugene Island	33.1	1.22	fob St. James, LA	500 b/d	1,000 b/d
HLS	32.0	0.42	fob Empire, LA	1,000 b/d	1,000 b/d
LLS (Month One)	37.0	0.38	fob Capline St. James LA	1,000 b/d	1,000 b/d
LLS (Month Two)	37.0	0.38	fob Capline St. James LA	500 b/d	1,000 b/d
Mars (Month One)	28.7	1.8	fob Clovelly, LA	1,000 b/d	1,000 b/d
Mars (Month Two)	28.7	1.8	fob Clovelly, LA	500 b/d	1,000 b/d
Poseidon	31	1.7	fob Houma, LA	500 b/d	1,000 b/d
Southern Green Canyon	28.7	2.38	fob Nederland, TX or Texas City, TX	500 b/d	1,000 b/d
Thunder Horse	32.7	0.62	fob Clovelly, LA	1,000 b/d	1,000 b/d

US Midcontinent

Grade	API Gravity	% Sulphur	Basis	Low/High Minimum Volume	VWA Aggregate Volume Minimum
WTI CMA	39.0	0.40	Cushing, OK	1,000 b/d	1,000 b/d
WTI Midland	39.0	0.40	Midland, TX	1,000 b/d	1,000 b/d
WTI P-Plus	39.0	0.40	Cushing, OK	500 b/d	1,000 b/d
WTS (Month One)	33.5	1.90	Midland, TX	1,000 b/d	1,000 b/d
WTS (Month Two)	33.5	1.90	Midland, TX	500 b/d	1,000 b/d

US West Coast

Grade	API Gravity	% Sulphur	Basis	Low/High Minimum Volume
San Joaquin Light Blend	28.5	1.10	Belridge Station, CA	1,000 b/d
Line 63	28.5	1.10	Hynes Station, CA	1,000 b/d
Midway Sunset	13.0	1.20	Station 36, CA	1,000 b/d

Midcontinent Delivered Equivalent Assessments

Grade	API Gravity	% Sulphur	Origin	Freight ($/bl)	Delivered Location
LLS	37.0	0.38	fob Capline St. James LA	$0.55	Chicago area
LSB	37.0	0.38	fob Cromer, Manitoba	$1.75	Chicago area
Mars	28.74	1.81	fob Clovelly, LA	$0.67	Chicago area
WCS	20.7	3.41	fob Hardisty, Alberta	$2.99	Chicago area
LLB	20.9	3.47	fob Hardisty, Alberta	$2.99	Chicago area

Crudes assessed according to volume-weighted average method:

Grade	Density (kg/m3)	API Gravity	% Sulphur	Pricing Basis	VWA Aggregate Volume Minimum	Low/High Minimum Volume
Syncrude (SYN)	860	31-33	0.1-0.2	Pembina AOSP at Edmonton	1,000 b/d; 159m3	500 b/d; 80m3
Western Canadian Select (WCS)	925	20-21	3.4-3.7	Husky at Hardisty	1,000 b/d; 159m3	500 b/d; 80m3

US Gulf Coast

Grade	API Gravity	% Sulphur	Basis	Timing	Minimum Volume
Basrah Light	30.0	2.00	cif US Gulf coast	10-45 Days Forward	500,000 bl
Escravos	34.0	0.15	cif US Gulf coast	10-45 Days Forward	500,000 bl
Forties	40.3	0.56	cif US Gulf coast	10-45 Days Forward	500,000 bl
Kissanje	29.8	0.38	cif US Gulf coast	10-45 Days Forward	500,000 bl
Nemba	38.7	0.19	cif US Gulf coast	10-45 Days Forward	500,000 bl
Qua Iboe	36.6	0.13	cif US Gulf coast	10-45 Days Forward	500,000 bl
Saharan Blend	46.0	0.10	cif US Gulf coast	10-45 Days Forward	500,000 bl

US West Coast

Grade	API Gravity	% Sulphur	Basis	Minimum Volume
ANS	32.3	0.89	cif US west coast	300,000 bl
Oriente	24.0	1.40	cif US west coast	360,000 bl

Canada

Grade	API Gravity	% Sulphur	Pricing Basis	Timing	Minimum Volume
Hibernia	35.0	0.45	fob Whiffen Head, Newf.	10-45 Days Forward	500,000 bl
Terra Nova	33.2	0.48	fob Whiffen Head, Newf.	10-45 Days Forward	500,000 bl

Canada

Grade	API Gravity	% Sulphur	Pricing Basis	Low/High Minimum Volume
Condensate	61-65	0.08-0.20	Enbridge CRW pool at Edmonton	500 b/d; 80m3
Mixed Sweet (MSW)	39-40	0.45	Enbridge at Edmonton	1,000 b/d; 159m3
Lloyd Blend (LLB)	20-21	3.47	Hardisty	500 b/d
Light Sour Blend (LSB)	38.0	0.88	Enbridge or Westspur at Cromer	500 b/d

Latin America

Grade	API Gravity	% Sulphur	Basis	Timing	Minimum Volume
Cano Limon	29.2	0.50	fob Colombia	10-45 Days Forward	500,000 bl
Castilla Blend	18.8	1.97	fob Colombia	10-45 Days Forward	500,000 bl
Cusiana	42.6	0.12	fob Colombia	10-45 Days Forward	500,000 bl
Escalante	24.1	0.19	fob Argentina	10-45 Days Forward	500,000 bl
Isthmus Formula	33.6	1.30	fob Mexico	Current calendar month	500,000 bl
Maya Formula	22.0	3.30	fob Mexico	Current calendar month	500,000 bl
Napo	18.5	2.00	fob Ecuador	10-45 Days Forward	360,000 bl
Olmeca Formula	39.3	0.80	fob Mexico	Current calendar month	500,000 bl
Oriente	24.0	1.40	fob Ecuador	10-45 Days Forward	360,000 bl
Vasconia	24.3	0.83	fob Colombia	10-45 Days Forward	500,000 bl

Argus Sour Crude Index (*ASCI*)

Argus publishes a daily price series that represents the value of US Gulf coast medium sour crude by including transactions from three separate crude streams: Mars, Poseidon and Southern Green Canyon. The Argus Sour Crude Index (*ASCI*) is a pricing tool that provides a broader index of US Gulf coast medium sour crude value for use in contracts. A full description of the methodology for the *ASCI* price is available by clicking here.

Updates

For the publication schedule check www.argusmedia.com.
The *Argus Americas Crude* methodology is constantly updated and revised. The latest available methodology (which may supersede the one you are reading) is available at www.argusmedia.com.