



Quality and Integrity of Spot Price Methodology

OPIS PCW publishes its market assessment methodology in full on this website and in abbreviated form in its nightly reports. The methodology is written in clear, easy-to-understand language and is fully available to the public and does not require a user name or password for access. Details of each product assessment's methodology are below.

Reliable, Indicative and Distortion-free

OPIS PCW's overarching strategic goal continues to be that it is recognized as a widely accepted fuel price benchmark for supply contracts and competitive positioning. OPIS PCW is relied on as a trusted benchmark because, based on its published methodology and internal policies and practices, OPIS PCW can provide assurance it remains completely unbiased and independent. OPIS PCW has no stake in fuel transactions, is not funded by oil industry initiatives, and strictly adheres to antitrust guidelines determined by independent legal counsel.

OPIS PCW does not discriminate between reporting parties that are in good standing and have demonstrated a commitment and reputation for truthful and accurate price discovery when calculating its market assessments.

Criteria and Procedures

OPIS PCW market assessors follow the marketplace throughout a full day of trading by constant communication with designated and approved traders and brokers to discover done deals, bids and offers. This full day methodology requires OPIS PCW market assessors to be in contact with active marketplace participants during every trading day.

The OPIS PCW full day methodology is applied to all of its market assessments with the exception of Europe LPG which utilizes a "market window" to capture deal activity. This window is described fully in the Europe LPG methodology (<https://www.OPIS-PCW.net.com/about/methodology/#europe-lpg-spot-pricing>). This "market window" approach to assessing the Europe LPG is a reflection of the preference of

the market participants as documented in OPIS PCW'SS electronic log of customer feedback and input and reflects the unique nature of the market's behavior.

OPIS PCW market assessors communicate with market participants via electronic instant messaging, email and telephone communication.

Additionally, OPIS PCW market assessors receive deal sheets from active market participants detailing their market activity for the day.

Only market data that fits OPIS PCW methodology is used in assessing ranges for OPIS PCW spot products. This includes restrictions on the timing of the market activity reports and the volume of product being traded as well as other factors as enumerated extensively by individual commodity, and made publicly available.

Preference for OPIS PCW market assessments is done deals. However, in the absence of done deals, OPIS PCW market assessors use confirmed bids and offers to set ranges for market assessments. Highest bid and lowest offer are used by OPIS PCW market assessors to set ranges in the absence of done deals.

In very illiquid markets, formulations are used to calculate values of derivatives of more liquid products based on historic market behavior. These formulations are set based on market participant feedback and approval.

OPIS PCW supervisors routinely review market assessors' judgments throughout the trading day and prior to publication of the assessment. Additionally, OPIS PCW supervisors review any market data not used in the assessment and the reasons they were not used.

Units of measure referenced in OPIS PCW market assessments vary depending on the standard measurements used by the commodity marketplace being followed (e.g., refined products are assessed in US dollars per barrel while renewable biofuels such as ethanol are assessed in US dollars per gallon; most petrochemicals are assessed in US dollars per pound).

Consistency Between Assessors

Each market OPIS PCW assesses has three fully trained market editors assigned to it. Each of these market editors is fully versed in the latest methodology, market participants and market intelligence available for that market. In the event the primary market editor is not available to assess his or her market, the secondary editor is fully capable of stepping in to assess the market. Additionally, a third level of redundancy in editorial continuity is built in. All OPIS PCW data is thoroughly archived and backed up by information technology systems and hardware on- and off-site.

New OPIS PCW market assessors undergo apprenticeship training in OPIS PCW methodology and are required to observe closely as veteran market assessors assess markets for a period of no less than four (4) weeks prior to assessing those markets themselves.

Additionally, OPIS PCW market assessors report to and are supervised by a core group of veteran OPIS PCW senior editors who ensure OPIS PCW methodology and defined practices and procedures for assessing markets are consistently followed.

Relative Importance of Types of Data

OPIS PCW market editors give all due priority to concluded transactions when making market assessments with the exception of market trading days in which an exceptional event or anomaly occurs just prior to OPIS PCW'SS deadline for publishing market assessments. However, all price assessments that deviate from OPIS PCW'SS prioritization policy for transactional data require the consultation and prior approval of a supervisory editor.

In the case of illiquid markets where transaction volume is light or non-existent, editors draw upon bids and offers and other market intelligence to set ranges. In some cases, assessments are made based on historically demonstrable formulaic relationships to more liquid products that are reviewed regularly with the marketplace to maintain their relevance.

Notional or Illiquid Markets

In the absence of done deals, OPIS PCW market assessors can set ranges for products in somewhat illiquid markets based on bids and offers heard in the marketplace. In such cases, OPIS PCW market assessors use a highest bid/lowest offer methodology.

Some OPIS PCW market assessments are “notional values” meaning the product markets being assessed do not typically feature daily activity such as done deals, bids or offers. Instead, these markets are understood by the marketplace, OPIS PCW customers and OPIS PCW market assessors as formulations referring back to a “parent”, more liquid product based on historical and logical pricing relationships affected by known transportation, storage or handling costs.

Timeliness of Data Submissions

OPIS PCW market assessors track spot markets on a full-day basis and OPIS PCW'SS daily ranges reflect confirmed trades by timing, volume, product and location each day.

“Typical” trading hours extend from 9:00 a.m. to 5:15 p.m. Eastern Time (6:00 a.m. to 2:15 p.m. Pacific Time). Deals that are received outside those hours are reviewed, evaluated and independently approved for consideration in our full-day ranges. In order to meet publication deadlines, OPIS PCW reserves the right to not accept deals as part of the final day's product ranges if that information is sent to/received by OPIS PCW after 5:15 p.m. (2:15 p.m. Pacific Time).

OPIS PCW market assessors sample on a daily basis a broad cross-section of refiners, traders, marketers, brokers and end users active in buying, selling or trading physical barrels. OPIS PCW policies and practices require market assessors to cast a wide net to capture as many transactions as possible in arriving at OPIS PCW day-to-day price assessments of spot market values. OPIS PCW market assessors take an “arm's length” approach to covering the market.

OPIS PCW daily spot market assessments include information obtained from “back office deal logs” sent to OPIS PCW as part of its daily market price discovery. The information highlights actual transactions during the day, including price, volume, product, timing and counter party.

OPIS PCW market assessors compare the end-of-the-day deal logs with our confirmed deals through the day to ensure OPIS PCW does not duplicate information. OPIS PCW confirms deals via constant communication with traders and brokers in the marketplace.

Bulk of Data from One or More Sources

OPIS PCW takes into account in its daily full-day price assessments market data from a variety of approved reporting entities. The volume of data coming from any single entity on any given day can vary, depending on that entities activity (buying or selling needs) in the marketplace.

OPIS PCW gives equal weight to all market data submitted and deals confirmed based on our published methodology. To ensure consistency and integrity, all deals are weighed equally, without respect to any single data provider constituting a significant proportion of the total data.

OPIS PCW requires its market assessors to conduct a broad canvass of the market each day so that OPIS PCW is not “submitter dependent” on any one source for any single portion of data.

Market liquidity varies by individual regions from day to day with pipeline scheduling days typically reflecting high volume days.

Criteria for Excluding Data

OPIS PCW adheres to its methodology language first and foremost. Any data that does not conform to the methodology’s definitions regarding timing, size, specification, volume or verifiability are not included in OPIS PCW’Ss market assessments.

All data exclusions must be reviewed and approved by an OPIS PCW supervisory editor.

Additionally, OPIS PCW market assessors reserve the right to exclude market data received that either: 1) cannot be repeated in the marketplace, 2) cannot be confirmed in the marketplace by counter-parties or independent market observers and/or 3) comes from a source that is unidentifiable and/or unverifiable as a “bona fide” source of market data.

Rationale for Methodology Adoption

All OPIS PCW market assessments follow methodologies reflective of the market’s actual behavior with regard to timing of trading, specifications of product, location of trading, and historically established relationships between products.

OPIS PCW methodologies are carefully crafted through market participant consensus and are designed to be inclusive of all market data that fits OPIS PCW published methodology parameters, including restrictions for inclusion of any market data that does not fit those same parameters.

The timeframes in which products are assessed are those requested by the market participants and vary from product to product.

OPIS PCW market assessments commonly use the terms “prompt” and “any” to describe the timing of product delivery. Definition of timeframes for these terms varies from market to market and from product to product. In general, however, “prompt” refers to product expected to make delivery within a week while “any” refers to product expected to make delivery after a week’s time but before the end of a month.

Procedures for Internal Review and Approval

OPIS PCW methodology is version controlled and constantly scrutinized for clarity, relevance and comprehensiveness by market assessors and senior editors. It is also reviewed and discussed regularly during weekly spot market editors’ meetings. Records of these meetings, subjects covered and market assessors in attendance are kept in a central electronic file.

OPIS PCW methodology language and any proposed changes are drafted by market assessors and/or senior editors and circulated for review by all other market assessors and senior editors involved in the market(s) and product(s) addressed by the methodology. All proposed changes are version-controlled and require approval by a senior editor prior to initiating external review.

Additionally, mandatory quarterly reviews of all OPIS PCW methodology are conducted and documented by relevant OPIS PCW market assessors and senior editors to ensure clarity, accuracy and relevance. Records of these quarterly methodology reviews, market participants polled and their feedback received are kept in a central electronic file.

Procedures for External Review and Approval

OPIS PCW methodologies are developed after substantial consultation with the stakeholder community, are in-line with market realities and are regularly reviewed by customers and editors on a quarterly basis.

Whenever an OPIS PCW methodology is being created or altered, stakeholders in the product market affected are consulted via a two-step process:

1. key stakeholders are asked to review an exposure draft of the proposed methodology (or change to methodology) and given adequate time (two to four weeks if the change is deemed “minor” and four to six weeks if the change is deemed “major”) to respond in writing with feedback and suggest changes, etc.
2. After key stakeholders are thus polled and changes are either accepted or rejected, the proposed methodology (or change to methodology) is circulated via email to all OPIS PCW customers who use (or would likely use) the market assessment. Thirty days are given for feedback and any suggested changes are given full consideration by senior editors and market assessors.

Reasons for rejecting stakeholder feedback might include, but are not limited to:

1. suggested changes would tend to make market discovery less transparent
2. suggested changes would exclude full market participation by otherwise bona fide market participants under the parameters of the methodology
3. suggested changes would unfairly favour one market participant or class of trade over another
4. suggested changes would limit the utility of the market assessment
5. suggested changes would distort the true functioning of the market assessment

Additionally, OPIS PCW reserves the right to reject any feedback it deems to be non-constructive or inherently untenable.

Changes to Methodology

OPIS PCW conducts quarterly spot methodology reviews during which our market editors consult with stakeholders to ensure our methodologies reflect current market realities and are as useful and relevant as they can be.

These spot methodology reviews are in addition to our ongoing and constant examination of our methodologies that may result in improvements in our processes and practices.

Both quarterly and as-needed methodology changes involve a robust polling of the marketplace to ensure all points of view are considered prior to any changes being considered or made.

During quarterly spot methodology reviews, all current methodology language is reviewed with stakeholders to ascertain if any improvements or revisions need to be made.

Based on the input received, OPIS PCW senior editorial leadership will decide whether to accept or reject suggestions made by stakeholders for methodology changes.

Once a spot methodology change is contemplated, OPIS PCW reaches out to stakeholders in the form of a formal letter delivered via email soliciting feedback on the change. Feedback may be given via post, email or telephone and the opportunity to comment on any contemplated spot methodology change is open for no less than two (2) weeks and generally not more than six (6) weeks.

In the case of methodology additions, a draft notice is sent out to customers with a deadline for comments set at a minimum of two (2) weeks.

OPIS PCW will publish stakeholder comments received with our responses regarding proposed methodology changes on our website and will respect commenter confidentiality as requested.

Methodologies are reviewed for relevance at least quarterly or when a material change is observed. A “material” change is defined as an alteration to the typical market activity brought on by either regulatory change or market supply/demand dynamics that alters, among other things, the assessed spot product’s typical volume, mode of transportation, commonly used nomenclature, chemical specification, trade liquidity or trading day hours.

Record Retention Policy

OPIS PCW’Ss Record Retention Policy requires that the assessor records as a minimum:

- The market data that was used
- The source of that data
- Any key judgements made by the assessor(s), such that the judgment is able to be understood by another assessor or supervisor
- Details of any transactions that were excluded which conformed to the requirements of the relevant methodology for that assessment and the rationale for doing so
- The identity of each assessor and of any other person who submitted or otherwise generated any of the above information.

Further, OPIS PCW’Ss Record Retention policy requires that all relevant information, including market assessor notebooks, emails and instant messenger logs are retained for 5 years.

OPIS PCW has a service agreement with a company that provides it with off-site electronic backup of its data.

Assessment communications including back office deal sheets, corrections logs, data exclusion logs and reporters’ worksheets are kept in a centrally accessible SaaS document third-party repository vendor for 5 years, with effect from at least 30 September 2013.

All published spot price assessments are kept in OPIS PCW’Ss spot assessment database and never erased.

Full-Day Philosophy

Before the start of each trading day, a value for commodity petrochemicals assessed by OPIS PCW PCW will be established. This will remain the prevailing value used for assessment that day until there is new market information. The value will change throughout the day when there is a higher bid seen, or a

lower offer, or a trade. At 4:00 p.m. US Eastern time, a final assessment will be made for the day using the most recent market information.

“Typical” trading hours extend from 9:00 a.m. to 4:00 p.m. Eastern Time (8:00 a.m. to 3:00 p.m. Central Time) Deals that are received outside those hours are reviewed and evaluated for consideration in our full-day ranges. In order to meet publication deadlines, OPIS PCW reserves the right to not accept deals as part of the final day’s product ranges if that information is sent to/received by OPIS PCW after 4:00 p.m. (3:00 p.m. Central Time).

We recognize ascertaining a spot product range can be subjective, and that there may be parties that dispute our numbers. Assessing markets requires judgment on the part of our editors, but those calls will be reviewed among experienced reporters and within the context of that day’s market. Ranges are only changed in the case of clerical errors such as typos or transposition mistakes.

Definition of “Last” and “Mean”

OPIS PCW Last: The OPIS PCW “Last” is a price indicator of where cash or spot market prices end for each full-day spot market trading session. It provides a numerical approximation of a refined products end-of-the day value.

The OPIS PCW “Last” is a market indicator number and DOES NOT necessarily reflect an actual spot market deal transaction. In other words, it DOES NOT necessarily reflect a “Last” trade. Instead, it is designed to indicate the market’s direction at the end of the trading day to help gauge the relative shift in physical values from day to day.

In the absence of an actual confirmed trade, the OPIS PCW “Last” may be included in OPIS PCW’Ss Full-Day Spot Trading Ranges using a “highest bid/lowest offer” methodology to pinpoint a reasonable number it would take to close a transaction at day’s end.

OPIS PCW Mean: The OPIS PCW Spot “Mean” represents the numerical mid-point of the OPIS PCW “low” and the OPIS PCW “high” calculated using actual spot market deals confirmed by OPIS PCW markets editors during the course of full-day trading.

OPIS PCW spot market transactions are made transparent during the day on the OPIS PCW Deal Log as part of the daily OPIS PCW Spot Ticker.

While the OPIS PCW Spot “Mean” is calculated using actual deal transactions from “low” to “high” during the day, editors do take into account in full-day price assessment end-of-the-day market shifts that potentially indicate new pricing levels.

At times to supplement confirmed deals or in the absence of confirmed deals, OPIS PCW editors use a “highest bid/lowest offer” methodology to assess the new pricing levels as part of the full-day range.

Data Collection

OPIS PCW editors sample on a daily basis a broad cross-section of refiners, traders, marketers, brokers and end users active in buying, selling or trading physical barrels. We cast a wide net to capture as many transactions as possible in arriving at our day-to-day price assessments of spot market values. Editors take an “arm’s length” approach to covering the market.

Editors confirm and record deals done for gasoline and distillate products that meet minimum pipeline/barge volumes specific to each geographic market. As the majority of the market is done on an EFP basis, we follow deals as basis discounts or premiums to the New York Mercantile Exchange. We consider fixed-price deals only if they fall within the full-day differential range based off the NYMEX at settlement, or to assess cash-for-cash “regrade” transactions.

OPIS PCW daily spot market assessments include information obtained from “back office deal logs” sent to us as part of our daily market price discovery. The information highlights actual transactions during the day, including price, volume, product, timing and counter party.

OPIS PCW has signed confidentiality agreements with some providers not to make this information public, except to use the transactions in our daily range of prices and weighted averages providing it meets our volume and timing criteria. OPIS PCW editors compare the end-of-the-day deal logs with our confirmed deals through the day to insure we do not duplicate information.

Editors respect the wishes of sources to remain anonymous in their activities in the market, and any information we receive regarding parties in deals is kept confidential.

Ranges reflect actual transacted deals. In the case of confirmed trading followed by a shift in the market without a done deal, editors will consider the last deal recorded and weigh it in light of subsequent buyer and seller bids and offers.

In the total absence of confirmed deals, we will use the input of the trading community to help us assess a viable “get-done” range and last value, and also consider the relationship the illiquid product may have with more actively-traded grades.

Typically, the “lowest sell price” and the “highest bid price” will be used to help us arrive at our full-day range.

Priority Ranking of Data Types

OPIS PCW market editors give all due priority to concluded transactions when making market assessments with the exception of market trading days in which an exceptional event or anomaly occurs just prior to OPIS PCW'SS deadline for publishing market assessments. However, all price assessments that deviate from OPIS PCW'SS prioritization policy for transactional data require the consultation and prior approval of a supervisory editor.

In the case of illiquid markets where transaction volume is light or non-existent, editors draw upon bids and offers and other market intelligence to set ranges. In some cases, assessments are made based on historically demonstrable formulaic relationships to more liquid products that are reviewed regularly with the marketplace to maintain their relevance.

OPIS PCW market assessors may take into account market intelligence or developments that come to their attention after a done deal or series of done deals when setting their ranges for particular products. The frequency of such inclusion of market intelligence or developments outside of done deals depends on the market and product being covered.

OPIS PCW market assessors give priority to done deals with the exception of market trading days in which an exceptional event occurs just prior to OPIS PCW'SS deadline for publishing market assessments. For example, after nearly a full day of market activity is recorded by an OPIS PCW market assessors a refinery experiences a fire or other emergency that would impact supply, market participants may report bids or offers outside of the range of the done deals recorded earlier in the day. If insufficient time remains for this activity to result in one or more new done deals, and none are

reported by deadline time, the OPIS PCW market assessor may include this new market data in his or her assessment of that day's market activity.

Only Bona Fide Sources Used

OPIS PCW market assessors only accept market data from submitters that represent actual participants who are designated and approved informed, vetted and trained observers of marketplace activity. These transactions are reported to OPIS PCW as "arms-length" transactions – buyers and sellers are independent of each other.

OPIS PCW spot market assessors expect data submitters act in good faith to submit only complete and truthful market intelligence about their trading activity. If any data submitter is found to be submitting incomplete or inaccurate data, OPIS PCW spot market assessors will no longer accept data from that submitter. OPIS PCW considers the data it receives to be sufficient and accurate to assess a spot product's value.

Anomalous or Suspicious Data

OPIS PCW has established a listing of approved acceptable anomaly or exception scenarios and instituted a practice for OPIS PCW market assessors to log excluded data – and their reasons for excluding it - as they receive it on a centrally located and accessible database spreadsheet. This logbook of excluded data is reviewed no less frequently than daily by a senior editor who must document approval or disapproval of the data excluded and the stated reasons for doing so.

Encouragement for Total Data Submission

It is OPIS PCW's firm policy that all submitters of market data or intelligence must act in good faith with OPIS PCW and its subscribers by disclosing only truthful and complete data relevant and pertaining to our spot market coverage. Any submitter found to be willfully submitting incomplete or untruthful data will be excluded from submitting data to OPIS PCW spot market assessments. For questions and/or feedback please contact OPIS PCW Vice President of Strategic Content, Steve Tan at steve.tan@ihsmarkit.com.

Submitter Quality and Integrity Standards

Infrequently, OPIS PCW market assessors encounter data submitters attempting to “talk their books” (i.e., only transmit market intelligence that supports their position in the market without reporting data that might disadvantage that position). These attempts to provide only partial information and thus influence our assessment range are discoverable through market assessors vetting the information submitted, anonymously, with other market participants and filling out the missing information from other market sources. It is the practice and policy of OPIS PCW market assessors to then confront the source of the incomplete data with any new market intelligence about their company’s activity and press to confirm the new information with the source. If data submitters do this often, their data will be excluded from market assessments since it gives an incomplete picture of market activity as it relates to their company. These attempts are infrequent as data submitters realize OPIS PCW market assessors, by fully investigating daily market activity, are likely to discover the full picture of trading activity in any event. Any data, thus offered in an incomplete fashion, will be excluded from our spot market assessment and so noted on our data exclusion sheet.

Size and Liquidity of Physical Markets

All of the parameters for data inclusion or exclusion for OPIS PCW market assessments are spelled out in the individual spot market methodologies, including, but not limited to: the size and liquidity of the physical market being assessed (meaning the number and volume of transactions submitted), the range and average volume and range and average of price, and indicative percentages of each type of market data that have been considered in an assessment.

Basis for Editorial Judgment

OPIS PCW adheres to its methodology language first and foremost. Any data that does not conform to the methodology’s definitions regarding timing, size, specification, volume or verifiability are not included in OPIS PCW’Ss market assessments.

Qualifications for Submitting Data

Submitters of market data to OPIS PCW must be market participants either actively trading the spot product market assessed on the day it is assessed or having traded the product market at least once within the last five (5) trading days.

Market participants are:

1. Traders – employees or contracted employees of companies engaged in physical buying or selling of the product being assessed either from the supply side or the demand side of the marketplace, or
2. Brokers – buyers and sellers of physical market products acting on behalf of clients who take or may take a financial position in the marketplace.

Evaluation of Data Submitters' Identities

OPIS PCW market assessors must know the source of market data being submitted and verify that they are now active or have been active within the past five (5) trading days in the marketplace of the product being assessed.

Identities of data submitters is held confidentially but is verified by OPIS PCW market assessors through:

1. his or her own experience and knowledge of the marketplace;
2. OPIS PCW enterprise-wide experience and knowledge of the marketplace based on the 100 plus years combined experience of our spot market editors; and/or
3. Data submitters' identity, title and company affiliation cross-referenced in OPIS PCW actively maintained database (this database is commercially available as well made available to OPIS PCW market assessors as the "OPIS PCW/Stalsby" line of industry directories: <http://www.OPISPCWnet.com/energy-directories.aspx>)

Back Office Submissions

OPIS PCW receives "deal sheets" during the trading day – most often near the close of trading – that illustrate a data submitting company's full trading activity for that day and the products traded.

These are submitted by data submitting company's back office departments, typically "risk management" officials who aggregate data from their energy or commodities desks.

Data submitters must be employees or contract employees in good standing of companies actively participating in market activity either daily or at least once every five (5) trading days. This status is verified by OPIS PCW market assessors on a daily basis through market research.

If a data submitter works for a company that does not submit deal sheets to OPIS PCW for purposes of market assessments and instead submits data on “as transacted” basis throughout the trading day, this data is vetted through independent market participant sources and verified before being included in a market assessment.

Identify Communications and Cross-checking Data

OPIS PCW market assessors are required to vet and verify all data submitted before including it in a spot market assessment by cross-checking market intelligence with other market participants who may have witnessed or been party to the transaction from the other side of the deal whenever possible. If submitted data cannot be verified, it is not used in setting the spot assessment and is logged in our data exclusion record which is reviewed and approved by a supervisory editor.

Infrequently, OPIS PCW is made aware of attempts by data submitters to submit false, misleading or incomplete data to an OPIS PCW market assessor for purposes of trying to move a market assessment one way or another. Such attempts were detected by OPIS PCW market assessors through the process of constant checking and verifying market intelligence with independent market participants and those data submitters were barred from submitting their data for inclusion in our market assessment.

Market Assessor Training, Experience & Skills

OPIS PCW employs a system of mentoring for junior market assessors and for market assessors seeking to learn other markets. This training process includes requirements for a deep understanding of our methodologies and policies as well as the nuances of the markets and products covered. No market assessor is allowed to assess a market without having undergone the prerequisite training and oversight by the mentoring editor.

Every three (3) months, OPIS PCW market assessors must undergo refresher courses on OPIS PCW'SS methodology, confidential information, conflicts of interest, personal account dealing, editorial independence and ethics policy.

As part of market assessors' quarterly training, examinations are administered by supervisory personnel and grades given to market assessors to ensure they possess a full and complete understanding of OPIS PCW methodology, the markets they will be covering and OPIS PCW compliance and ethics policy. If any market assessor does not achieve and maintain our internal certification, or a passing grade on this quarterly examination, he or she will not be allowed to assess a market until such time as a passing grade can be achieved. An electronic record of each OPIS PCW market assessors' test grades will be made available for external audit.

Prior to employment at OPIS PCW, every market assessor must submit to, undergo and pass a criminal background check.

Assessments Produced on a Consistent Basis; Succession Plans

OPIS PCW employs a system of scheduling market assessors that includes no less than two (2) alternate market assessors for each market who are adequately trained and sufficiently experienced at covering that market if the primary market assessor were to, either expectedly or unexpectedly, become unavailable to cover his or her market. This schedule is developed each week by a supervisory senior editor with input from all market assessors. Only market assessors who are adequately trained and have recently (no less than twice within the last ten (10) trading days) covered the market are eligible as alternates.

OPIS PCW maintains an vacation and “outs” calendar that is centrally available to all OPIS PCW personnel. OPIS PCW market assessors must give their supervisory editor a minimum of two weeks’ notice for planned absences in order to adequately prepare a back-up market assessor that is qualified to carry on their daily spot market assessment duties.

OPIS PCW routinely cross-trains market assessors to be proficient in markets other than their primary market in order to ensure sufficient alternates are available to cover a market at any given time.

OPIS PCW market assessors write, maintain and review quarterly a “grey book” of instructions on how to cover markets that is centrally available to all OPIS PCW market assessment personnel. This “grey book” is version-controlled to ensure only the most recent information is included.

OPIS PCW maintains quality control over market assessors work through the daily review of assessment prior to publication (electronic systems prohibit market assessors from publishing market assessments, only supervisory editors can publish assessments). No OPIS PCW market assessor can approve and publish their own assessments.

Data exclusions are logged, reviewed and approved by supervisory editors on an ongoing, daily basis.

OPIS PCW market assessors are cross-trained to qualify to assess other spot markets and must do so at a minimum two (2) days per week to maintain a good working knowledge of the activities of the marketplace. No OPIS PCW market assessor can assess a single market for a number of days to exceed seven (7) trading days in any 10-day period.

Supervision of Assessors

OPIS PCW employs a secure, third-party service provider that provides permission-based, real-time monitoring of emails, instant messages and file transfers as well as archiving capability with full search functionality.

OPIS PCW senior editors in a supervisory role actively monitor the data submissions and conversations between OPIS PCW market assessors and data submitters and can flag certain keywords appearing in those electronic communications that might require further investigation, training or disciplinary action.

Also, OPIS PCW senior editors must sign off on each and every market assessment as part of an inhouse secure, permission-based electronic system before that market assessment can be published. Unless a senior editor has signed off on an assessment via this system, the market assessment cannot be published.

All market assessments can only be based upon or corroborated by evidence captured by the third-party service provider software.

Additionally, for no less than five (5) years, OPIS PCW keeps records of all market assessor training on methodology, marketplace dynamics and OPIS PCW compliance and ethics policy, including certificates of completion, testing materials administered and individual market assessors' grades for those examination materials. OPIS PCW also keeps an electronic copy of weekly editorial meeting notes including records of participants, subject matter discussed and action items assigned.

Data exclusions and the rationale behind them must be reviewed and approved by a senior editor. Similarly, all corrections must be approved by a senior editor prior to being published.

All communications between OPIS PCW market assessors and data submitters are archived in a secure, permission-based central database for no less than five (5) years. These communications are separated by market assessor (including identification) and include, but are not limited to,:

- Instant messenger communications (e.g., Yahoo! IMs)
- Emails including attachments of deal sheets and market information submissions
- Worksheets submitted daily by market assessors via scanned pdfs
- Data exclusion and reasoning logs complete with senior editor review and authorization signature
- Deal logs entered into OPIS PCW'SS proprietary and secure intranet spot assessment tool

All market assessments can only be based upon or corroborated by evidence captured by the third-party service provider software.

Conflicts of Interest

OPIS PCW'SSs market assessors may not use corporate property, information, or position for improper personal gain, and no employee may compete with the OPIS PCW directly or indirectly. As employees they have a duty to OPIS PCW to advance its legitimate interests when the opportunity to do so arises. Accordingly, they are expected to avoid any association that might conflict with loyalty to the OPIS PCW or compromise their judgment. A conflict of interest exists whenever a person's private interests and his or her business responsibilities are at odds. OPIS PCW prohibits conflict of interest and while it is not possible to identify every particular activity that might give rise to a conflict of interest, examples of conflicts of interest that should be avoided include the items listed below:

- any consulting or employment relationship with any customer, supplier or competitor;
- any outside business activity by an employee that is competitive with the OPIS PCW'SS business;
- receiving any gifts, gratuities or entertainment from any person or entity with which OPIS PCW has business dealings other than commonly distributed items of nominal value that are given for advertising or promotional purposes or those that conform to customary industry practices;
- using for personal gain or for the benefit of others, confidential, or proprietary information obtained during their employment with OPIS PCW;
- loans to, or guarantees of obligations of, partners, officers or employees;

- taking advantage of an opportunity that an employee learned of in the course of his or her employment with OPIS PCW;
- employees owning stock in a competitor, supplier or vendor, other than insignificant amounts in publicly traded companies;
- selling anything to OPIS PCW, buying anything from OPIS PCW or entering into business transactions with OPIS PCW on terms other than those which apply to unaffiliated third parties, unless approved in advance by OPIS PCW senior management; and
- using or misappropriating any data you learned of in the course of your employment with OPIS PCW in a manner that would directly or indirectly provide the employee with an economic benefit.

Annual Acknowledgment

All OPIS PCW market assessors, are required to execute an annual acknowledgement of the Code of Conduct representing that they have read and understand acceptable and non-acceptable behavior.

Personal Account Trading Policy

OPIS PCW market assessors are forbidden from holding stock, engaging in trading activity or holding a financial position in any of the companies that participate in the markets we assess or report on other than indirect amounts of stock of publicly traded companies. Also, the spouses and immediate family of OPIS PCW market assessors must not own stock, engage in trading activity or hold a financial position in any of the companies participating in the markets we assess or report on other than insignificant amounts of stock in publicly traded companies.

Job Offers

OPIS PCW market assessors must, upon penalty of discipline up to and including termination, immediately report to OPIS PCW senior management any and all job offers proffered by market participants and/or data submitters.

If the OPIS PCW market assessor contemplates accepting the job offer, he or she will immediately be transferred off the market assessment related to the market participant or data submitter's market.

If the OPIS PCW market assessor declines the job offer, the declination must be made immediately to the offering party.

OPIS PCW senior management will monitor any communication on this subject between the market assessor and the data submitter or market participant.

Upon pain of discipline up to and including termination, OPIS PCW market assessors must not be engaged in personal activity that results in a conflict of interest, such as possessing a personal or financial relationship with a participant in a market that OPIS PCW assesses or accept gifts in excess of \$50 aggregate per year.

To ensure integrity of our business relationships, OPIS PCW market assessors are required to be accompanied by OPIS PCW senior editors in a supervisory role whenever visiting with market sources. Any attempt to influence a market assessor, e.g., violate OPIS PCW gift policy, by a market participant would be halted and the market assessor would receive instruction both verbal and written on why such activity cannot be permitted. Additionally, the market participant would be informed of OPIS PCW policy prohibiting such activity.

All gifts and offers inadvertently received from data submitters or market participants must be documented and reported to OPIS PCW senior management immediately.

Policies Kept Current

The above stated conflict of interest policies are kept current by way of quarterly review by OPIS PCW senior management and authorized Human Resources personnel.

Wall of Separation: Editorial / Marketing / Sales

OPIS PCW functionally and physically separates its marketing and sales departments from the editorial (including market assessment) group. Each has its own director-level senior staffer that is empowered to make individual decisions and report directly to the President of OPIS PCW. Additionally, no editor, market assessor or editorial supervisor is compensated or incentivized via a sales-related bonus plan.

Management of Advertising Conflicts with Market Participants

OPIS PCW's sales and advertising departments understand there is no "quid pro quo" for advertising with OPIS PCW that would guarantee favorable editorial treatment in either news or market analyses. Indeed, routinely, advertisers and sponsors of OPIS PCW publications and events are the subject of

objective, unbiased news analysis and market reporting without prejudice to the amount (or lack thereof) of sponsorship and/or advertising revenue spent with the company.

OPIS PCW supervisory editors monitor the constantly updated list of advertisers and sponsors of OPIS PCW products and events in order to be alert to and to halt and report any communication to influence or attempt at coercion from the advertiser, sponsor or any other OPIS PCW personnel, including sales, related to OPIS PCW spot market assessments. OPIS PCW supervisory editors utilize the independent, third-party e-mail and instant message software system referenced above for this purpose.

Remuneration for Pricing Editors Not Tied to Sales of Price Reporting Services

No OPIS PCW pricing editor or market assessor is incentivized on sales of OPIS PCW products.

Electronic Access

All OPIS PCW archives of corrections, data exclusions, supervisor sign-offs on assessments, market assessor test scores and all other sensitive and/or confidential data are accessible based on a permission-based hierarchy system of access: market assessor (lowest level), senior editor/supervisor (medium-level access), director and/or President (highest level).

OPIS PCW is a Payment Card Industry-compliant shop. The PCI Data Security Standard represents a common set of industry tools and measurements to help ensure the safe handling of sensitive information. Initially created by aligning Visa's Account Information Security (AIS)/Cardholder Information Security (CISP) programs with MasterCard's Site Data Protection (SDP) program, the standard provides an actionable framework for developing a robust account data security process - including preventing, detecting and reacting to security incidents.

In security terms, it means that OPIS PCW adheres to the PCI DSS requirements for security management, policies, procedures, network architecture, software design and other critical protective measures.

Security procedures required for PCI compliance with regard to receiving and processing credit card payments have multiple beneficial effects on overall data security for OPIS PCW'SS market assessment and editorial functions as well:

- All OPIS PCW laptops, personal computers and mobile devices that can access OPIS PCW data servers and data are password-encrypted.
- Passwords must meet complex "strength" standards for access.

- Passwords must be changed every 3 months.
- OPIS PCW market assessors accessing the OPIS PCW servers or network remotely are issued a VPN (virtual private network) token with a randomly generated set of six digits that changes every one (1) minute. This code along with a four-digit code set by each individual market assessment is required to gain access to OPIS PCW servers.
- All OPIS PCW laptops and personal computers automatically lock after 10 minutes of inactivity. Each employee must enter his or her password to regain entry.
- OPIS PCW facilities are secure and accessible only by radio-frequency enabled employee key cards.
- Any missing key cards and/or VPN tokens and any OPIS PCW laptop, personal computer or mobile device must be reported to Corporate IT security immediately.
- No OPIS PCW employee is allowed to write down or share his or her password with anyone else either inside or outside the company except to authorized IT personnel or senior management.

Personal Account Trading Policy

OPIS PCW employees are forbidden from holding stock or a financial position in any of the companies that participate in the markets we assess or report on other than indirect amounts of stock of publicly traded companies. Also, the spouses and immediate family of OPIS PCW employees must not own stock or a financial position in any of the companies participating in the markets we assess or report on other than indirect amounts of stock in publicly traded companies.

OPIS PCW market assessors may not engage in bidding, offering or trading of market products on either a personal basis or on behalf of market participants.

Accounting

OPIS PCW uses an electronically secure system for processing corporate card expenditures which requires full disclosure of the nature of expenses, including names, companies and titles of any guests included in an expense and reason for the expense. These reports must be reviewed and authorized by a senior editor prior to approval. Additionally, accounting personnel scrutinize these reports prior to approval and payment.

Human Resources

OPIS PCW employs Human Resources and benefits professionals who establish and monitor corporate benefits such as individual retirement accounts. These accounts held by OPIS PCW market assessors are prohibited from direct investment in companies that are the subject of OPIS PCW market assessments.

OPIS PCW market assessors report to a senior editor who in turn reports to a director-level executive. At each level (market assessor, senior editor and director), employees are held accountable for following OPIS PCW methodology and ethics policy regarding conflict-of-interest avoidance upon disciplinary penalty up to and including termination. Director-level executives report to the President of OPIS PCW.

The President of OPIS PCW and the ownership of OPIS PCW'SS parent company IHS Markit emphasize and endorse a strict adherence to our Code of Conduct and allocate the resources needed to maintain our enforcement mechanisms and policies.

No OPIS PCW market assessor, senior editor or director-level executive is engaged in, or incentivized by, sales of OPIS PCW products.

Complaints

OPIS PCW publicly makes available and follows a formal complaints process under which:

- Complaints are logged on a standard form by OPIS PCW'SS Customer Service department.
- Complaints can either be telephoned in, emailed in or submitted online.
- Once the form has been filled including complete details on the identity of the complainant, his or her company and contact information, nature of the complaint (including market assessment and/or report as applicable) and time of the complaint, the complaint is forwarded to a Customer Service supervisor.
- If the complaint pertains to an OPIS PCW market assessment, the Customer Service supervisor passes along the complaint form to the market assessor covering that particular market.
- If the complaint pertains to an OPIS PCW methodology and how it is structured, the Customer Service supervisor passes it along to the supervisory editor of the spot market assessment in question for due consideration.
- If a request for correction is made, the market assessor logs the request including the particular

product and assessment being questioned, time of the corrections request, nature of the correction request and what other assessments and/or reports may be impacted by the request.

- This corrections log is kept in a centrally available, permission-level access enabled central repository for no less than five (5) years.
- A senior editor then reviews the request and either approves or rejects the corrections request.
- If the corrections request is rejected, the reason for the rejection is logged and relayed back to the complainant.
- If a correction is issued, the correction notice with corrected data appears in the next communication to OPIS PCW subscribers.
- If a complainant whose request for correction was denied wishes to further pursue the request, they have the right to speak promptly to the market assessor's supervisor, followed by the director of the division, followed by the President of OPIS PCW. Beyond this avenue of redress, the complainant would then be referred to Corporate Counsel.

OPIS PCW Spot Price Customer Bill of Rights

Every spot price editor at Oil Price Information Service understands that his or her top priority is calling market assessments fairly. Our methodologies are crafted after careful consultation with our customers and applied by our editors to ensure maximum transparency and accuracy.

Still, we understand there may be times when spot price customers wish to question, dispute or comment on a price assessment and/or our methodologies. As a valued OPIS PCW spot price customer, you have the right to:

- a prompt reply to any inquiry regarding price assessments and/or methodology within two trading days
- a full consideration by senior OPIS PCW spot market personnel of any request for a correction or adjustment of a price assessment as well as any suggested changes to OPIS PCW spot price methodology and
- complete confidentiality.

Oil Price Information Service Customer Care is available by telephone Monday through Friday, 7:30am-6:30pm and Saturday, 8:00am-12:00noon ET. at 888-301-2645 and by email at energycs@OPISPCWnet.com.

OPIS PCW supervisory editors will monthly review complaints and correction statistics to identify and if need be, address, areas of concern, e.g., multiple errors regarding market assessors' application of our methodology. These reviews and statistics will be made available for external audit.

OPIS PCW supervisory editors conduct any inquiry or dispute of an OPIS PCW spot market assessment independent of the market assessor who reported the assessment. This inquiry is conducted directly with the complainant and involves independent verification of the veracity of the claim. If such a complaint warrants a correction, a correction is then ordered by the OPIS PCW supervisory editor. If a correction is not warranted because it does not fit the criteria of our OPIS PCW methodology, the supervisory editor will communicate this to the complainant along with a complete explanation in a timely manner.

A corrections log is kept and reviewed monthly by senior editors for root cause analysis and corrective action/retraining as necessary.

Cooperation with Authorities

OPIS PCW will cooperate with market authorities to the full extent required by law.

External Auditing

OPIS PCW engages an external service provider to perform an examination of our operational policies, controls and practices, designed to comply with IOSCO's Principles for Oil Price Reporting Agencies and our published spot price reporting methodologies.

Below are methodologies and specifications for Ethylene, Propylene, Polyethylene and Polypropylene.

OPIS PCW PetroChem Wire Methodology: Ethylene

OPIS PCW PetroChem Wire publishes closing prices for ethylene at the close of each trading day for two ethylene systems:

1. The NOVA hub at Mont Belvieu, Texas (referred to as FOB MtB-NOVA or MtB-N)
2. The Boardwalk Midstream hub at Choctaw, Louisiana (referred to as FOB Choctaw or Choc)

OPIS PCW PetroChem Wire's spot market information is gathered from the market at large.

All deals, bids and offers are directly confirmed to be firm and valid by editors employed by OPIS PCW PetroChem Wire.

OPIS PCW PetroChem Wire editors reserve the right to exercise editorial judgment in prioritization of information and also the option to not include certain information in its valuation process due to lack of clarity or lack of detail needed to confirm information.

The following methodology contains the guiding concepts OPIS PCW PetroChem Wire editors use. Ultimately, all valuations are at the discretion of editors' judgement.

CLOSING DAILY PRICE ASSESSMENT / FRONT MONTH

OPIS PCW PetroChem Wire assesses closing values as the most recently completed transaction UNLESS a bid is above that transaction or an offer is below it "at the close" - assessing value above an unanswered bid or below an unanswered offer. The close is currently defined as 3 p.m. US Central Time. Each system is assessed separately.

Example 1: May ethylene trades at \$0.50/lb at 1 p.m. US Central Time. Between 2 p.m. and 3 p.m., it is bid at \$0.49/lb and offered at \$0.55/lb. OPIS PCW PetroChem Wire would assess the closing price of May at the transacted level of \$0.50/lb.

Example 2: May ethylene trades at \$0.50/lb at 1 p.m. US Central Time. At 2:30 p.m., it is bid higher, at \$0.51/lb, but the lowest offer is \$0.55/lb. At 3 p.m., May is still bid at \$0.51/lb and offered at \$0.55/lb. No transactions were concluded. OPIS PCW PetroChem Wire would assess the closing price of May at the bid level of \$0.51/lb, higher than the transacted level from earlier in the day. www.petrochemwire.com

PRIORITY OF INFORMATION

In determining values for each day's assessment, a variety of information is considered. Some information is inherently more influential. In ranking order, information of the following type is considered when assessing cash market prices:

1. Firm bids and offers. Assessments must fall between the highest bid and the lowest offer. Bids and offers must be on an outright price basis, such as \$0.50/lb.
2. Done deals. When confirmed transactions fall within a market's closing bid/ask range, the latest confirmed transaction will often be the assessment. Bids and offers must be on an outright price basis, such as \$0.50/lb.
3. Formula-based/floating price deals, bids and/or offers. In the absence of outright prices, transactions and firm bid/offer ranges on a relative basis (such as time spreads or on a feedstock basis) may be considered as an indicator of value.

4. Paper (swaps) deals, bids and/or offers. In the absence of physical market prices, transactions and firm bid/offer ranges in paper markets may be considered as an indicator of value. A bid or an offer is considered to be firm when it is demonstrated to be available to the market at large for a minimum of 15 minutes. Such demonstrations could include posting bids and/or offers through a voice broker or an electronic trading platform.
5. Minimum volume. Volumes of 3 million pounds or more for a single month's delivery are considered to be standard volumes. Volumes of less than 3 million pounds may be considered to represent value at the discretion of OPIS PCW PetroChem Wire editors.

FORWARD CURVE PRICE ASSESSMENTS

OPIS PCW PetroChem Wire publishes daily forward curves for ethylene basis FOB MtB-NOVA and basis FOB Choctaw that include price assessments for delivery time frames extending 24 months into the future. Forward price assessments are determined by:

1. The most recent outright price deals concluded for specific time periods including months (such as January 2018 at \$0.60/lb).
2. Combined periods (Jan-Feb 2018 at \$0.60/lb, 1Q 2013 at \$0.59/lb, etc.)
3. Spread trades, bids and offers that demonstrate relative value to time periods (such as Jan/Feb at 1 cpp backward, Jan/2Q at 1.5 cpp backward, etc.).
4. Spread trades, bids and offers between the MtB-NOVA and Choctaw systems that demonstrate relative value (such as Jun Choctaw/MtB-NOVA at 1 cpp premium on Choctaw, etc.).

CALENDAR AVERAGES

OPIS PCW PetroChem Wire publishes Calendar Averages on the last business day of each month for its two daily ethylene assessments (MtB-NOVA and Choctaw). These averages are simple arithmetic averages of the daily closing prices starting on the first business day of each month, such as April 1-30.

WEIGHTED AVERAGES

OPIS PCW PetroChem Wire publishes a weighted monthly average price for ethylene on the last business day of each month.

OPIS PCW PetroChem Wire collects spot market transaction information each day for use in calculating its weighted averages each month.

Deals must be reported and confirmed by at least one deal participant.

Deal information must include transaction date, volume, delivery month and transmission system.

Only deals with an outright price are used to calculate the weighted averages.

Deals concluded on an index basis are not included by OPIS PCW PetroChem Wire for consideration in its weighted averages.

Ethylene deal information is published for delivery to or from the two common storage systems (MtB-NOVA and Choctaw). Deal information from proprietary pipeline and storage systems is also published, referred to as either Texas-Other (TX-O) or Louisiana-Other (LA-O).

Volumes of deals are published in aggregate form and not on a deal-by-deal basis.

30-Day Weighted Average Prices are determined by dividing the sum of deal prices by the sum of deal volume for transactions for delivery during a given month that occurred between the first business day of that month and the last business day of that month, such as deals for May delivery that transacted between May 1 and May 31.

45-Day Weighted Average Prices are determined by dividing the sum of deal prices by the sum of deal volume for transactions for delivery during a given month that occurred between the 16th day of the month preceding that month and the last business day of that month, such as deals for May delivery that transacted between April 16 and May 31.

Volumes used to calculate the averages are published in aggregate form as:

1. MtB-NOVA
2. Texas-All (combined MtB-NOVA and TX-Other)
3. Choctaw
4. Louisiana-All
5. Texas/Louisiana-All (combined Texas-All & Louisiana-All).

Product specifications

- Ethylene: 99% minimum purity

OPIS PCW PetroChem Wire Methodology: Propylene

OPIS PCW PetroChem Wire publishes closing prices for two grades of propylene at the close of each trading day.

1. Polymer Grade Propylene at the Enterprise hub at Mont Belvieu, Texas (referred to as FOB MtB-EPC or MtB-E).
2. Refinery Grade Propylene delivered by pipeline at the Enterprise hub at Mont Belvieu, Texas. PetroChem Wire's spot market information is gathered from the market at large.

All deals, bids and offers are directly confirmed to be firm and valid by editors employed by OPIS PCW PetroChem Wire.

OPIS PCW PetroChem Wire editors reserve the right to exercise editorial judgment in prioritization of information and also the option to not include certain information in its valuation process due to lack of clarity or lack of detail needed to confirm information.

The following methodology contains the guiding concepts OPIS PCW PetroChem Wire editors use. Ultimately, all valuations are at the discretion of editors' judgement.

CLOSING DAILY PRICE ASSESSMENT/FRONT MONTH

OPIS PCW PetroChem Wire assesses closing values as the most recently completed transaction UNLESS a bid is above that transaction or an offer is below it "at the close" - assessing value above an unanswered bid or below an unanswered offer. The close is currently defined as 3 p.m. US Central Time. Each system is assessed separately.

Example 1: May PGP trades at \$0.50/lb at 1 p.m. US Central Time. Between 2 p.m. and 3 p.m., it is bid at \$0.49/lb and offered at \$0.55/lb. OPIS PCW PetroChem Wire would assess the closing price of May at the transacted level of \$0.50/lb.

Example 2: May PGP trades at \$0.50/lb at 1 p.m. US Central Time. At 2:30 p.m., it is bid higher, at \$0.51/lb, but the lowest offer is \$0.55/lb. At 3 p.m., May is still bid at \$0.51/lb and offered at \$0.55/lb. No transactions were concluded. OPIS PCW PetroChem Wire would assess the closing price of May at the bid level of \$0.51/lb, higher than the transacted level from earlier in the day.

PRIORITY OF INFORMATION

In determining values for each day's assessment, a variety of information is considered. Some information is inherently more influential. In ranking order, information of the following type is considered when assessing cash market prices:

1. Firm bids and offers. Assessments must fall between the highest bid and the lowest offer. Bids and offers must be on an outright price basis, such as \$0.50/lb.
2. Done deals. When confirmed transactions fall within a market's closing bid/ask range, the latest confirmed transaction will often be the assessment. Bids and offers must be on an outright price basis, such as \$0.50/lb.
3. Formula-based/floating price deals, bids and/or offers. In the absence of outright prices, transactions and firm bid/offer ranges on a relative basis (such as time spreads or on a feedstock basis) may be considered as an indicator of value.
4. Paper (swaps) deals, bids and/or offers. In the absence of physical market prices, transactions and firm bid/offer ranges in paper markets may be considered as an indicator of value. A bid or an offer is considered to be firm when it is demonstrated to be available to the market at large for a minimum of 15 minutes. Such demonstrations could include posting bids and/or offers through a voice broker or an electronic trading platform.

Minimum volume

PGP: Volumes of 3 million pounds or more for a single month's delivery are considered to be standard volumes. Volumes of less than 3 million pounds may be considered to represent value at the discretion of OPIS PCW PetroChem Wire editors.

RGP: Volumes of 20 thousand barrels or more for a single month's delivery are considered to be standard volumes. Volumes of less than 20 thousand barrels may be considered to represent value at the discretion of OPIS PCW PetroChem Wire editors.

FORWARD CURVE PRICE ASSESSMENTS

OPIS PCW PetroChem Wire publishes a daily forward curve for PGP basis FOB MtB-EPC that includes price assessments for delivery time frames extending 24 months into the future.

Forward price assessments are determined by:

1. The most recent outright price deals concluded for specific time periods including months (such as January 2018 at \$0.60/lb).
2. Combined periods (Jan-Feb 2018 at \$0.60/lb, 1Q 2013 at \$0.59/lb, etc.).
3. Spread trades that demonstrate relative value to time periods (such as Jan/Feb at 1 cpp backward, Jan/2Q at 1.5 cpp backward, etc.).

CALENDAR AVERAGES

OPIS PCW PetroChem Wire publishes Calendar Averages on the last business day of each month for its two daily propylene assessments (PGP and RGP). These averages are simple arithmetic averages of the daily closing prices starting on the first business day of each month, such as April 1-30.

WEIGHTED AVERAGES

OPIS PCW PetroChem Wire publishes a weighted monthly average price for propylene on the last business day of each month.

OPIS PCW PetroChem Wire collects spot market transaction information each day for use in calculating its weighted averages each month.

Deals must be reported and confirmed by at least one deal participant. Deal information must include transaction date, volume, delivery month and transmission system. Only deals with an outright price are used to calculate the weighted averages. Deals concluded on an index basis are not included by OPIS PCW PetroChem Wire for consideration in weighted averages.

Propylene deal information is published for delivery to or from the common storage systems of MtB-EPC, as well as deal information from proprietary pipeline and storage systems, referred to as either Texas-Other (TX-O) or Louisiana (LA).

Volumes of deals are published in aggregate form and not on a deal-by-deal basis.

30-Day Weighted Average Prices are determined by dividing the sum of deal prices by the sum of deal volume for transactions for delivery during a given month that occurred between the first business day of that month and the last business day of that month, such as deals for May delivery that transacted between May 1 and May 31.

45-Day Weighted Average Prices are determined by dividing the sum of deal prices by the sum of deal volume for transactions for delivery during a given month that occurred between the 16th day of the month preceding that month and the last business day of that month, such as deals for May delivery that transacted between April 16 and May 31.

Volumes used to calculate the averages are published in aggregate form as:

1. MtB-EPC
2. Texas-All (combined Mt B-EPC and TX-Other)
3. Louisiana-All
4. Texas/Louisiana-All (combined Texas-All & Louisiana-All).

Product specifications

- Refinery grade propylene: 65% minimum purity (contained in propane stream)
- Polymer grade propylene: 99.5% minimum purity
- Chemical grade propylene: 94% minimum purity

OPIS PCW PetroChem Wire Methodology: Spot Polymers

OPIS PCW PetroChem Wire publishes prices for the following resins on each US business day.

FOB Houston

- HDPE blow mold
- LLDPE butene film
- HoPP injection
- HoPP raffia

FOB Chicago

- HDPE blow mold
- LLDPE butene film
- HoPP injection

Delivered East of the Rockies

- HDPE blow mold
- HDPE injection
- HDPE high molecular weight film
- LLDPE butene film
- LDPE clarity film

- HoPP injection
- CoPP injection
- GPPS
- HIPS

For each of the above resins, a daily bid, offer and closing price is published for the current month. For the prices that are basis FOB Houston and FOB Chicago, forward pricing is also published for months 2-24. Delivered East of the Rockies basis prices reflect generic prime railcar transactions between resellers (brokers/distributors) and end users. Prices are published on a \$/lb basis.

Price Description and Methodology Material Certification

OPIS PCW PetroChem Wire resin prices are published daily and are for spot transactions for prime and generic prime material understood to be certified as such by a major producer or distributor. Branded prime material can be considered in the absence of information about generic prime material.

Delivery location

Prices reflect delivery for locations as described:

1. To warehouses in the greater Houston area. Warehouses include Packwell (Houston), Frontier Logistics (La Porte), KTN (LaPorte) and United (Houston). In the event of conflicting deals, bids or offers, priority will be given first to material delivered at Packwell (Houston) and second to material delivered at Frontier (La Porte).
2. To warehouses in the greater Chicago area. In the event of conflicting deals, bids or offers, priority will be given to material delivered at warehouses in Chicago, IL; Morris, IL; and Gary, IN. Deals done at warehouses in Akron, OH, and Toledo, OH, may also be considered.
3. Payment terms. For bilateral transactions, PetroChem Wire editors will give primary consideration to transactions that include 30-day payment terms.

Volume standards

Volumes considered to be standard are between one (1) and five (5) railcars. Volumes greater than five (5) railcars will be considered in the absence of smaller-volume transactions, but will be analyzed as its relative value as a bulk-volume deal.

Priority of Information

In determining values for each day's assessment, a variety of information is considered. Some information is inherently more influential. In ranking order, information of the following type is considered when assessing cash market prices:

1. Firm bids and offers. Assessments must fall between the highest bid and the lowest offer. Bids and offers must be on an outright price basis, such as \$0.50/lb.

2. Done deals. When confirmed transactions fall within a market's closing bid/ask range, the latest confirmed transaction will often be the assessment. Bids and offers must be on an outright price basis, such as \$0.50/lb.
3. Formula-based cash market deals, bids and/or offers. In the absence of outright prices, transactions and firm bid/offer ranges on a relative basis (such as time spreads or on a feedstock basis) can be considered as an indicator of value.
4. Paper (swaps) deals, bids and/or offers. In the absence of outright prices, transactions and firm bid/offer ranges in paper markets can be considered as an indicator of value.

OPIS PCW PetroChem Wire publishes a bid, offer and closing price for each resin category described above. A bid or an offer is considered to be firm when it is demonstrated to be available to the market at large. Such demonstrations could include posting bids and/or offers through a voice broker or an electronic trading platform. OPIS PCW PetroChem Wire editors must reserve the right to exercise editorial judgment in not including certain information in its daily published information either for lack of clarity or lack of detail needed to confirm information.

Product Specifications

- LDPE film: 2 melt, 0.92 density, barefoot or medium adds, haze at or less than 6%
- LLDPE butene film: 1 melt, 0.918-0.920 density, barefoot or medium adds
- HDPE blow mold (copolymer): 0.3-0.39 melt, 0.950-0.956 density
- HDPE injection (copolymer): 5-8 melt, 0.952-0.954 density
- HMW HDPE film: 8 HLMI, 0.952 density
- HoPP raffia: 2.9-4.5 melt
- HoPP injection: 12, 20 or 35 melt
- CoPP injection: 12, 20 or 35 melt; 2-3 izod
- HIPS: 8 melt, 2-2.5 izod
- GPPS: 8-10 melt

Please direct questions to Kathy Hall at 720 480 6288 / Kathy@petrochemwire.com.