



## Overview

For more than a decade, OPIS PetroChem Wire has been a news and pricing leader in the olefins and plastics marketplace. We have served customers throughout many industry segments – traders, suppliers, end-users, and distributors – with up-to-the minute news, analysis and pricing that appears in our many published reports and on-line services.

Since June 2009, OPIS PetroChem Wire has been the primary data provider for CME and ICE benchmarks including ethylene, propylene and polypropylene. Seven CME futures contracts and one on ICE settle on PetroChem Wire forward curves.

OPIS PetroChem Wire editors collectively have more than a century of experience covering petrochemical and plastics markets. Our editors know that our numbers are commonly referenced by the industry, but we remain at arms' length. OPIS PetroChem Wire does not invest in chemical or plastics companies, speculate on chemical or plastics prices or accept special favors.

OPIS PetroChem Wire 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.

Market data is collected by editors via telephone calls, emails, instant messaging and electronic transfer of back office deal sheets. Market data must be provided to OPIS PetroChem Wire editors on the day the market is assessed or it will not be considered in the daily assessment. It must be provided within five days of the trade to be included in the OPIS PetroChem Wire monthly weighted averages.

Editors undergo rigorous internal market training and supervision before assessing markets, as do "backup" editors who may be called on to fill in for a particular market's primary editor. Editors' market assessments are internally reviewed daily prior to publication by a supervisory editor who checks their accuracy and adherence to OPIS PetroChem Wire methodology.

OPIS PetroChem Wire editors always search for the most complete picture of market activity in their assessments. However, with some products and in some markets the amount of transactional data is much less comprehensive. In such case, OPIS PetroChem Wire editors are trained to use bid/ask ranges to set highs and lows.

Highest bid and lowest offer may set the parameters of these ranges. In some cases, historically demonstrated mathematical formulae may be applied to calculate the differential value of an illiquid product relative to a more liquid product.

In some markets and with some products, one or more market sources may provide the majority of market data used by the OPIS PetroChem Wire editor in assessing the market's value. It is OPIS PetroChem Wire policy and methodology that such price discovery, while not as desirable as a variety of sources for market data, is still valid for the purposes of setting a market value in the absence of any other data.

OPIS PetroChem Wire 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.

OPIS PetroChem Wire spot market editors reach out to stakeholders through a variety of communication channels including email, telephone and instant messaging to garner input on any contemplated methodology changes.

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 PetroChem Wire 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 PetroChem Wire 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 four (4) weeks and generally not more than six (6) weeks.

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.

In each of OPIS PetroChem Wire's spot methodologies, the timeframe for accepting data submissions for inclusion into our spot market assessments is set to be as accurate and reflective of market behavior as is possible given our publication deadlines.

In some markets, the timeframe available for data submissions may be longer or shorter than in other markets in order to reflect the unique nature of the spot markets being assessed.

It is OPIS PetroChem Wire's firm policy that all submitters of spot market data or intelligence must act in good faith with OPIS PetroChem Wire and its subscribers by disclosing only truthful and complete data relevant and pertaining to our spot market coverage. OPIS PetroChem Wire will not accept any data submissions resulting from inter-affiliate transactions. Any submitter found to be willfully submitting incomplete or untruthful data will be excluded from submitting data to OPIS PetroChem Wire spot market assessments. In addition, OPIS PetroChem Wire may at its discretion report the suspected attempt at contributing knowingly false data to the submitter's company and/or immediate supervisor. For questions and/or feedback please contact OPIS Director of Content Robert Gough at [rgough@OPISnet.com](mailto:rgough@OPISnet.com) or 1 301.284.2138.

This document explains our methodology for price collection at all levels and the steps we take to ensure data integrity and accuracy.

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### **OPIS PetroChem Wire Spot Price Customer Bill of Rights/Complaints Policy**

Every spot price editor at OPIS PetroChem Wire 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 PetroChem Wire 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 PetroChem Wire spot market personnel of any request for a correction or adjustment of a price assessment, as well as any suggested changes to OPIS PetroChem Wire spot price methodology
- complete confidentiality.

You can fill out our [online comment form](#) to let us know if you have a question, complaint, compliment or comment about one of our spot assessments.

The appropriate OPIS PetroChem Wire personnel will reply to complaints with two (2) spot trading days via email. This reply may or may not be a resolution of the complaint, but it will acknowledge receipt of the complaint and assure the complainant that he or she can expect an answer in a timely manner.

If after receiving OPIS PetroChem Wire's answer to the complaint, a complainant wishes to appeal OPIS PetroChem Wire's decision, he or she has the right to seek recourse with an independent third party arbiter appointed by OPIS PetroChem Wire.

[Go here to view OPIS PetroChem Wire's Spot Price Assessment Methodology Commentary.](#)

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## **Quality and Integrity of Spot Price Methodology**

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

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

OPIS PetroChem Wire market assessors communicate with market participants via electronic instant messaging (e.g., ICE IM, Skype), email and telephone communication.

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

Only market data that fits OPIS PetroChem Wire methodology is used in assessing ranges for OPIS PetroChem Wire 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.

The preference for OPIS PetroChem Wire market assessments is done deals. However, in the absence of done deals, OPIS PetroChem Wire market assessors use confirmed bids and offers to set ranges for market assessments. The highest bid and lowest offer are used by OPIS PetroChem Wire 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 PetroChem Wire supervisors routinely review market assessors' judgments throughout the trading day and prior to publication of the assessment. Additionally, OPIS PetroChem Wire supervisors review any market data not used in the assessment and the reasons they were not used.

Units of measure referenced in OPIS PetroChem Wire market assessments vary depending on the standard measurements used by the commodity marketplace being followed (e.g. certain chemical feedstocks are assessed in US cents or dollars per gallon; globally traded petrochemicals most commonly transact on a US dollar per metric ton basis).

### **Consistency Between Assessors**

Each market OPIS PetroChem Wire assesses has 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, a secondary editor is fully capable of stepping in to assess the market. All OPIS PetroChem Wire data is thoroughly archived and backed up by information technology systems and hardware on- and off-site.

New OPIS PetroChem Wire market assessors undergo apprenticeship training in OPIS PetroChem Wire methodology and are required to observe closely as veteran market

editors assess markets for a period of no less than four (4) weeks prior to assessing those markets themselves.

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

## Data Collection

### Relative Importance of Types of Data

OPIS PetroChem Wire 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 PetroChem Wire's deadline for publishing market assessments. However, all price assessments that deviate from OPIS PetroChem Wire's prioritization policy for transactional data require the consultation and prior approval of a supervisory editor.

### Only Bona Fide Sources Used

OPIS 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 as "arms-length" transactions – buyers and sellers are independent of each other.

### Record retention – Five years

OPIS market editors retain records of all market data used in market assessments for a period of no less than five years in a secure electronic environment.

### Corrections policy – who may correct and who must review

Upon discovery of the need for a correction, whether realized internally or from an outside party alerting an OPIS market editor, a correction is drafted by the market editor who assessed the market in question. That corrections draft is reviewed by a direct supervisor who reviews it for accuracy and then issues the correction through the same communication medium used to assess the market. Only market editors who are directly involved in the market assessment in question may draft a correction and only a supervisor of that market editor can authorize the issuance of a correction.

## Conflict of Interest policies

### Wall of separation: editorial/marketing/sales

OPIS PetroChem Wire separates its marketing and sales departments from the editorial group functionally. Each has its own director-level senior staffer that is empowered to make individual decisions and report directly to the OPIS CEO.

Additionally, no editor or editorial supervisor is compensated or incentivized via a sales-related bonus plan.

### **Management of advertising conflicts with market participants**

OPIS PetroChem Wire's sales and advertising departments understand there is no "quid pro quo" for advertising with OPIS that would guarantee favorable editorial treatment in either news or market analyses. Routinely, advertisers and sponsors of OPIS 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.

### **Conflict of interest policy – gifts policy**

See Gifts, Meals & Entertainment – IHS Inc. Business Code of Conduct, page 13.

### **Personal account trading policy**

See Advantageous Opportunities – IHS Inc. Business Code of Conduct, page 14.

### **Notional or Illiquid Markets**

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.

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

Some OPIS PetroChem Wire 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 PetroChem Wire customers and OPIS PetroChem Wire 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.

Before the start of each trading day, a value for ethylene will be established and reported in the OPIS PetroChem Wire Midday Update report.

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.

Example: the published value is 50 cents, based on yesterday's closing value. A broker then posts a real-time bid of 50.5 cents prior to 8 a.m. US Central Time. At 8 a.m., the day begins with that value of 50.5 cents. The value used for assessment will stay at 50.5 cents until there is a higher bid, or a lower offer, or a new trade.

### **Timeliness of Data Submissions**

OPIS PetroChem Wire market assessors track spot markets on a trading-day basis and OPIS PetroChem Wire's daily ranges reflect confirmed trades by timing, volume, product and location each day.

"Typical" trading hours extend from 9 a.m. to 4 p.m. Eastern Time (8 a.m. to 3 p.m. Central Time). Deals that are received outside of those hours are reviewed, evaluated and independently approved for consideration to begin valuation the next business day at that level. In order to meet publication deadlines, OPIS PetroChem Wire 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 PetroChem Wire after 4 p.m. Eastern Time (3 p.m. Central Time). Bids and offers may move end-of-day ranges outside of the demonstrated transactional range of the day.

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

OPIS PetroChem Wire daily spot market assessments include information obtained from "back office deal logs" sent to OPIS PetroChem Wire 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 PetroChem Wire market assessors compare the end-of-the-day deal logs with our confirmed deals through the day to ensure that OPIS PetroChem Wire does not duplicate information. OPIS PetroChem Wire confirms deals via constant communication with traders and brokers in the marketplace.

### **Bulk of Data from One or More Sources**

OPIS PetroChem Wire 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 entity's activity (buying or selling needs) in the marketplace.

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

Market liquidity varies from day to day, and from product to product.

### **Criteria for Excluding Data**

OPIS PetroChem Wire 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 PetroChem Wire’s market assessments.

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

Additionally, OPIS PetroChem Wire 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 PetroChem Wire 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 PetroChem Wire methodologies are carefully crafted through market participant consensus and are designed to be inclusive of all market data that fits OPIS PetroChem Wire 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 PetroChem Wire market assessments occasionally use the terms “specified prompt” and “any delivery” 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 PetroChem Wire 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 bi-weekly market editors' meetings. Records of these meetings, subjects covered and market assessors in attendance are kept in a central electronic file.

OPIS PetroChem Wire 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 the Director of Content Development prior to initiating external review.

Additionally, mandatory quarterly reviews of all OPIS PetroChem Wire methodology are conducted and documented by relevant OPIS PetroChem Wire 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 PetroChem Wire 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 PetroChem Wire methodology is being created or altered, stakeholders in the product market affected are consulted via a two-step process:

- 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.
- 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 PetroChem Wire 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:

- suggested changes would tend to make market discovery less transparent
- suggested changes would exclude full market participation by otherwise bona fide market participants under the parameters of the methodology
- suggested changes would unfairly favor one market participant or class of trade over another

- suggested changes would limit the utility of the market assessment
- suggested changes would distort the true functioning of the market assessment.

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

## **Changes to Methodology**

OPIS PetroChem Wire 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 PetroChem Wire 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 PetroChem Wire 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 four (4) 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 maximum of two (2) weeks. OPIS PetroChem Wire will publish stakeholder comments received with our responses regarding proposed methodology changes on our website and will respect commenter confidentiality as requested.

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## **Anti-Trust Policy**

Since 2007, clients have trusted OPIS PetroChem Wire to adhere to strict anti-trust guidelines in collecting and distributing sensitive chemical and plastics pricing data.

With chemical prices under increasing scrutiny, OPIS PETROCHEM WIRE recognizes that suppliers cannot afford even the slightest perception of price sharing or price signaling.

### **Price Discovery**

Many of the daily prices we report provide key benchmarks for some of the largest buyers and sellers of chemicals and plastics in the world. Large petrochemical companies, industrial and manufacturing companies, traders, distributors and plastics converters buy and sell chemicals and plastics based on OPIS PetroChem Wire spot market assessments.

For North American markets, editors confirm and record deals done for chemicals and plastics between 9 a.m. and 4 p.m. Eastern time (8 a.m.-3 p.m. Central time) on a fixed price basis or in a relationship to another product or location or timing (example: Choctaw ethylene differential trades at a 1 cent premium to Mont Belvieu NOVA (MtB-NOVA) ethylene; current month Mont Belvieu propylene trades at a penny over next month Mont Belvieu propylene). Transaction data is due to OPIS PetroChem Wire no later than 4 p.m. Eastern time.

### **Data Integrity**

Because of the subjectivity of publishing chemical and plastics spot ranges, editors talk to a very broad cross-section of participants including domestic and international producers, end users, processors, traders, brokers, distributors, shippers, and wholesalers.

Price ranges represent where the bulk of product is moving and do not include deals struck under extraordinary circumstances and far outside the range of other deals reported on a given day, or far above or below confirmed seller or buyer levels, or under certain volumes (generally 3 million pounds for ethylene and polymer grade propylene and 20,000 barrels for refinery grade propylene).

Minimum volumes are not necessarily a consideration for Louisiana ethylene price ranges due to illiquidity and infrequent trading in that region. This market will continue to be assessed based on most recent transactions reported to OPIS PetroChem Wire, market surveys of most recent spread assessments to more liquid markets and the best bid-ask spread available through brokers and electronic exchanges.

Editors have the ability to review and reflect transactions reached on electronic platforms, such as ICE, within published ranges, but posted “bid/asked” numbers or even confirmed deals on such networks are viewed subjectively by OPIS PetroChem Wire staff. It is up to individual OPIS PetroChem Wire editors to determine whether prices quoted on electronic platforms fall within the reasonable realm of where business is being done — OPIS PetroChem Wire will not include a price within its daily ranges simply because it appeared on an electronic platform.

Transactions with the unique purpose of transferring volume to an export terminal operator will not be considered as spot market deals as they are a logistics necessity with an assigned value already derived from true spot market transactions.

Finally, a note about errors and disputes. We recognize that ascertaining a spot product range is highly subjective and realize that there will be parties that dispute our "call." Ranges are only changed in the case of clerical errors such as typos or transposition mistakes. We never alter ranges simply because of complaints.

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

### **OPIS PetroChem Wire Methodology: Ethylene**

OPIS 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 Enterprise hub at Mont Belvieu, Texas (referred to as FOB MtB-EPC or MtB-E)
3. The Boardwalk Midstream hub at Choctaw, Louisiana (referred to as FOB Choctaw or Choc)

OPIS 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 PetroChem Wire.

OPIS 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 PetroChem Wire editors use. Ultimately, all valuations are at the discretion of editors' judgement.

### **CLOSING DAILY PRICE ASSESSMENT / FRONT MONTH**

OPIS 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 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 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](http://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 PetroChem Wire editors.

### FORWARD CURVE PRICE ASSESSMENTS

OPIS PetroChem Wire publishes daily forward curves for ethylene basis FOB MtB-NOVA, ethylene basis FOB MtB-EPC 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 PetroChem Wire publishes Calendar Averages on the last business day of each month for its daily ethylene assessments (MtB-NOVA, MtB-EPC 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 PetroChem Wire publishes a weighted monthly average price for ethylene on the last business day of each month.

OPIS 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 PetroChem Wire for consideration in its weighted averages.

Ethylene deal information is published for delivery to or from the three common storage systems (MtB-NOVA, MtB-EPC 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. MtB-EPC
3. Texas-All (combined MtB-NOVA and TX-Other)
4. Choctaw
5. Louisiana-All
6. Texas/Louisiana-All (combined Texas-All & Louisiana-All).

## Product specifications

- Ethylene: 99% minimum purity

## **OPIS PetroChem Wire Methodology: Propylene**

OPIS 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 PetroChem Wire.

OPIS 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 PetroChem Wire editors use. Ultimately, all valuations are at the discretion of editors' judgement.

### **CLOSING DAILY PRICE ASSESSMENT/FRONT MONTH**

OPIS 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 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 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 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 PetroChem Wire editors.

### FORWARD CURVE PRICE ASSESSMENTS

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

OPIS 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 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 PetroChem Wire Methodology: Spot Polymers**

OPIS 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 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 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 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

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