

PRICE ASSESSMENT METHODOLOGY AND SPECIFICATIONS

Recovered Paper – North America

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UNDERSTANDING RISI PRICE ASSESSMENTS

Each price assessment is...

RISI's assessment of the **open market price** based on **actual market data** gathered from a **broad, systematic survey** of market participants that has been **rigorously evaluated** to produce an assessment.

Open market price: Price for regular business excluding one-off/spot, internal transfers and transactions whose price is not negotiated, i.e. prices determined by a formula based on published prices from RISI or other source. (See *"Grade detail and specifications" below*)

RISI price assessors consider a range of market data, including actual transaction prices, bids and offers, trigger prices and supporting data. (See *"Assessment Calculation" below*)

Survey has thorough representation of the market and includes both buyers and sellers, and a range of players from small to large. (see *"Data collection process" below*)

Assessment procedures include evaluation, verification, weighting and aggregation, plus confirmation of the assessment by a supervising editor. (See *"How prices are assessed" below*)

About this methodology

RISI Indices is the division of RISI responsible for price assessments. This document describes the procedures RISI Indices uses to determine its North American recovered paper price assessments. As of 2015, this methodology has been strengthened by application of the Principles for Oil Price Reporting Agencies published by IOSCO, the International Organization of Securities Commissions (www.iosco.org).

RISI has *voluntarily* chosen to adapt these principles to the markets we cover even though our markets fall outside of the governance of IOSCO and the Principles. That's because these guidelines represent the internationally recognized gold standard in price assessment. By adapting and implementing these principles, RISI demonstrates its commitment to providing the highest degree of reliability in price reporting.

For more on the Principles and how RISI has applied them, see "Implementation of IOSCO's Principles for Oil Price Reporting Agencies" at www.risi.com/iosco.

HOW PRICES ARE ASSESSED

Who assesses prices

Prices are assessed by a North American team of recovered paper editors, who are part of RISI Indices group, separate from RISI Analytics group involved in forecasting. Standards for training, experience and skills required for editors involved in price assessment, as well as supervision of editors, are described in the RISI Indices Price Assessment Procedures Manual.

Generators are included if they sell directly to mills, but otherwise are not included as sources. Specifics are indicated in the "Grade Detail and Specifications" section below for each grade.

All market participants are encouraged to submit price data and supporting market information for inclusion in the assessment.

Data collection process

RISI makes price assessments based on a systematic survey of active market participants to find out agreed transaction prices and volumes as well as price offers made or received, and other supporting information such as supply and demand conditions.

RISI encourages organizations to submit all their pricing data, especially all the concluded transactions. Depending on market liquidity, RISI reserves the right to also base its prices on bids, offers, deals heard, trigger prices and market participants' assessment or indication of prevailing values.

The amount and type of information that a respondent provides each month varies across individuals and companies; data from respondents providing more complete information is weighted more heavily in the final assessment. Price data are also weighted roughly according to tonnage. (See "*Weighting of data*" below.)

RISI welcomes organizations to submit transaction data from authorized back office functions. RISI may sign Non-Disclosure Agreements (NDA) with any data provider, if requested to do so, in order to maximize the number of data points collected for inclusion in the assessment or index calculation.

Data providers

The survey includes both buyers and sellers, ensuring that the survey pool is balanced and representative of the overall market. Assessments represent prices paid by mills or exporters, so the sellers included in the survey include processors and brokers.

How data are provided

Each price period, the price assessor contacts data providers and collects data via phone interviews, emails and text messages.

Assessment calculation

Types of data considered

The following types of data are considered when producing price assessments.

- Transaction prices
- Bids and/or offers made or received
- Trigger prices
- Participants estimates of market levels
- The change in price levels from previous periods
- Other market information such as prices in related markets, supply and demand fundamentals etc.

RISI has clear specifications for all the price points that it covers. All the reference units, such as currency and volume, are in line with recognized conventions in the pulp and paper markets.

Guidelines on the use of judgement

When assessing market prices, greater weighting is generally given to actual concluded transaction data. Next in terms of importance come bids and offers made or received. RISI does not set a minimum threshold for the amount of transaction data needed to produce assessments.

In the absence of sufficient transaction data, bids and offers or other actual price information, RISI reserves the right to use other factors to determine the assessment. These include:

- market participants' trigger prices;
- market participants' reports of the change in prices from previously assessed periods;
- market fundamentals such as changes in inventory levels, shipments, operating rates and export volumes;
- relative values of similar commodities in the same region;
- relative values of the same commodity in different regions;
- changes in the value of the commodity's primary feedstock or primary derived product(s).

In very opaque markets, where little actual market data is available, price developments may at times not be immediately apparent. If RISI price assessors detect this, their market assessments in the next reporting period would generally reflect the price change. This is in line with RISI's policy of acting on new information as it becomes available.

Criteria for exclusion of data

Data are excluded from the assessment in the following cases:

- The price of a transaction is indexed to published prices from RISI or another source.
A transaction price is considered to be "indexed" when it is entirely determined according to a formula based on a published price assessment.
- The transactions don't meet the assessment specifications. (See "Grade Detail and Specifications" section below.)
- The transaction has special circumstances that, in the price assessor's judgment, render it unrepresentative of the broader market and/or not repeatable. (This type of exclusion is rarely used.)

Exclusion of premiums

In cases where a data provider provides a price point that is a net price, or where it's unclear whether a given price point includes premiums or what portion of the net price is the premium, the price is compared to last month's price from that data provider to find the price change. The price *change* is included in the data pool for the current month's assessment.

Changes in premiums: To maintain consistency over time, RISI prices are gross prices excluding premiums but seek to capture the month-to-month change in overall average net market prices.

For instance, say that in a given month a data provider reported a price before premiums of \$150 and an average premium of \$10. The next month, if that provider reported prices were unchanged but premiums had gone up to \$15, resulting in a net price of \$165, this would be interpreted in our price assessment as an increase in price of \$5. This \$5 increase would need to have occurred in a majority of a regional market for it to affect the reported price in the region.

Weighting of data

- Higher-quality data are weighted more heavily than lower-quality data. Higher-quality data includes:
 - Data with more detail, e.g. prices reported as separate transactions with accompanying volume rather than an overall average price.
 - Data whose credibility is supported by answers to the assessor's follow-up questions
 - Data from contacts with a history of reliability. Contacts are deemed more reliable if they:
 - Provide information that is corroborated by other sources
 - Provide complete and detailed information
- Provide information regularly and consistently over time
- Report price information that goes against their natural interests (e.g. a buyer reporting higher prices or a seller reporting lower prices)
- Data are weighted according to the type of information
- Larger transactions are given more weight than smaller ones. However, the weighting of any single data provider's data is limited so that it doesn't dominate the assessment. For Category 1 prices (e.g. OCC Midwest – see "Grade Detail and Specifications" below), this cap is more formal: no single data provider's data will be weighted so that it contributes more than 25% of the final assessment.

CONTROLS AND COMPLIANCE

Ensuring consistency and quality of assessments

RISI Indices has in place a number of procedures to ensure the consistency and quality of price assessments, including:

- **Sign-off:** Prior to publication, each price assessment is reviewed by a senior price assessor other than the assessor primarily responsible for the assessment to ensure the assessment is accurate and has followed proper procedures.
- **Quality assurance audit:** A supervising editor is responsible for overseeing all price assessments. The supervisor will periodically do a detailed review of decision-making for a given price assessment, reviewing price assessments in relation to assessments from similar markets, ensuring that the methodology has been followed consistently and that judgment has been applied appropriately.
- **Market review:** On a regular basis (i.e. annually for the main containerboard grades), Indices staff reviews markets and methodologies to ensure that assessment methodologies and the assessments they produce are appropriate for the market.
- **External audit:** In accordance with the standards of IOSCO's PRA Principles, Category 1 price assessments (benchmark grades, e.g. OCC Midwest – see

specifications below) are audited to ensure that assessments comply with this methodology and with IOSCO's PRA Principles.

Following its acquisition by Euromoney plc in 2017, RISI is currently in the process of implementing a new policy and compliance regime. Some of the commitments made to adapt IOSCO's Principles for Oil Price Reporting Agencies have therefore been paused temporarily. These include annual internal quality assurance reviews and external audits. This by no means indicates a relaxation in standards. RISI remains committed to providing the highest quality of price reporting through robust methodologies and strong internal processes.

Independence and freedom from conflicts of interest

Please see RISI Indices' Conflicts of Interest Policy (www.risi.com/conflicts). Key points include:

Independence of RISI

RISI has no affiliation with buyers or sellers of forest products and therefore no vested interest in either higher or lower prices.

Absence of financial interest

RISI is free of ownership or other ties that would give it a financial interest in the movement of prices we report. RISI prohibits its employees who conduct price

assessments from having a financial interest (excluding passive investments like mutual funds) in companies whose values are directly and substantially affected by prices on which they report.

Separation from forecasting

RISI Indices is a separate business unit from RISI Analytics, which carries out RISI's forecasting activities, ensuring that forecasting of future prices doesn't influence assessment of actual prices.

Confidentiality

Our data providers are essential to our work, so RISI Indices goes to great lengths to keep price survey data confidential. Confidential data include both the data collected and the names of individuals and companies who provide data. RISI's policy is to neither confirm nor deny the participation of any individual or company in our price surveys at any time, either directly or indirectly.

This confidentiality is essential to ensure the highest number of data contributors as well to ensure that contributing data to RISI cannot be used as a means for market players to unfairly communicate to each other.

RISI Indices' Confidentiality and Data Protection policy (www.risi.com/confidentiality) explains full details around how price assessors protect the confidentiality of their contacts and data. Each year, price assessors are trained in data protection procedures and must sign a compliance agreement.

Antitrust compliance

All price assessment methodologies from RISI Indices are explicitly designed to comply with antitrust rules. See RISI Indices' Antitrust Compliance Policy (www.risi.com/antitrust) for further details.

Disclaimer of warranty

Although RISI collects information from sources who are believed to be reliable, RISI does not warrant or guarantee the accuracy or completeness of its price assessments. Actual transaction prices will often vary from the assessed level. Under no circumstances shall RISI nor any of its subsidiaries, parent corporations and affiliates, and all of their respective officers, directors, owners, employees, agents, licensors, representatives, licensors and suppliers (collectively, the "RISI Parties"), be liable for any loss or damage caused by your reliance on information obtained through the RISI services. It is your responsibility to evaluate the information, opinion, advice, or other content available through the RISI services.

Changes and feedback

Changes to methodology and specifications

RISI Indices periodically reviews the markets it covers to ensure that our methodology and specifications are still appropriate for that market.

Understanding that some RISI Indices price assessments are used in long-term contracts, RISI Indices seeks to minimize changes that will affect the continuity of its price assessment over time.

Prior to implementing any material changes to the methodology and specifications, these changes will be announced in draft form and open for comment from all stakeholders. RISI Indices will review all comments and seek to balance the views of all players as much as possible while ensuring the reliability of price assessments.

Based on comments received, RISI Indices will finalize the changes and announce them to the market, specifying exactly what will change and when.

Corrections and non-market adjustments

Publication of price errors can occasionally happen for reasons that may include technical, input errors or incorrect application of the methodology. To minimize the inconvenience to our subscribers, RISI aims to investigate each error as soon as it becomes aware of it and to publish a correction promptly. If the correction is substantial, a Coverage Note will be published on the RISI website and an email will be sent to subscribers with an explanation of the reason for the correction.

RISI will publish a correction of a price only where it has established undeniably that there has been an error. RISI price assessments are produced based on the best data available at the time of the assessment. It will not retroactively change a price based on new information or additional submission of data received after a respective pricing session has closed.

Occasionally, in very opaque markets, price developments may not become apparent for some time. If this happens, RISI reserves the right to adjust a price series upwards or downwards to bring it back in-line with market values. Such cases should not be considered corrections but rather non-market price adjustments. A retroactive correction of the price history would not normally be made. RISI has a very structured process for such non-market adjustments, similar to that for changes to methodologies and specifications. They would only be implemented after industry consultation. Ample notice would be given of the proposed adjustment and stakeholders would have the chance to send their feedback.

Feedback and complaints

RISI Indices welcomes feedback on its price assessment methodology as well as on specific price assessments published. We greatly value such feedback and the dialogue that it generates.

In general, such feedback is most effectively dealt with by the editor directly in charge of the price assessment in question. We invite you to speak with or email any of your existing contacts within the editorial team, or view a list of contacts at www.risi.com/EditorialContacts.

If working with the editor does not adequately address your issue, please view our procedures for submitting complaints at www.risi.com/complaints.

GRADE DETAIL AND SPECIFICATIONS

Where published	<p>RISI publishes monthly US prices for recovered paper in <i>PPI Pulp & Paper Week</i> (PPW). These prices can be accessed by subscribers in these ways:</p> <ul style="list-style-type: none"> Recovered Paper Price Watch (pdf) Online (interactive database) <i>PPI Pulp & Paper Week</i> Newsletter (pdf) <p>Secondary publication: <i>World Recovered Paper Monitor</i></p>
Frequency	Monthly
Schedule	<p>Assessments are published the 5th of each month at 3pm ET, unless:</p> <ul style="list-style-type: none"> There are less than 2 business days before the 5th of the month due to the national US holidays; The 5th of the month falls on a weekend in a week without holidays. <p>In either of these two cases, prices are published on the 4th, 6th or 7th of the month at 3pm ET. A detailed publication schedule is available online at https://www.risiinfo.com/approach/methodology/price-assessment-methodology/price-publishing-schedule/.</p> <p>Subscribers are notified via email when the latest assessments are available, and may access the assessments via the Recovered Paper Price Watch (pdf) or the online Price Watch database.</p> <p>Assessments are published in <i>PPI Pulp & Paper Week</i> Newsletter following the issue of Recovered Paper Price Watch.</p>
Assessment time window	<p><i>Primary assessment window: Orders taken in the month to date for shipment in the current month.</i></p> <p><i>Secondary assessment window: Price data from the 20th to the end of the month is included in either of two cases:</i></p> <ul style="list-style-type: none"> A data provider has no qualifying transactions in the primary window. Other data suggest that dramatic market pricing changes have occurred leading up to the primary assessment window. <p>However, these older prices are only considered in the assessment if they show movement that can be corroborated by data from other data providers from the primary assessment window.</p>
Transaction types reflected	<p>Open market transactions, i.e. spot transactions and contract transactions where prices are negotiated each month. Excludes contract transactions whose price is indexed to published prices (whether from RISI or other source).</p>
Prices excluding premiums	<p>To maintain consistency over time, RISI prices for the US domestic market are gross prices excluding premiums but seek to capture the month-to-month change in overall average net market prices. In other words, RISI reports gross prices that hold the premium constant from month to month.</p> <p>For instance, say that in a given month a data provider reported a price before premiums of \$150 and an average premium of \$10. The next month, if that provider reported that prices were unchanged but that premiums had gone up to \$15, resulting in a net price of \$165, this would be interpreted in our price assessment as an increase in price of \$5.</p>

Terms	<p><i>Domestic prices:</i> Mill purchases, FOB seller's dock</p> <p><i>Export prices:</i> FAS port or CFR, as indicated</p>
Physical specifications	<ul style="list-style-type: none"> • Grades and preparation requirements are based on definitions in the current ISRI Scrap Specifications Circular, but are modified as necessary to reflect generally prevailing market practice. For instance, if the physical specifications of a grade that is commonly traded in the market frequently fall short of the ISRI specifications. RISI prices reflect what is commonly traded rather than the ISRI specification. • Baled • Full truckload quantities • Standard quality; no distressed lots
Arms-length transactions	Only transactions between unaffiliated parties are reflected. Transfers by recycling companies to their own mills are excluded.
Normal terms of payment	Price estimates assume normal and customary payment terms.
Currency/units	US dollars per short ton unless otherwise indicated
IOSCO categories	<p>See implementation of IOSCO's Principles for Price Reporting Agencies for definition of categories</p> <p>OCC Midwest: Category 1</p> <p>All others: Category 2</p>

Domestic price assessments

About the following tables:

Grade name: Numbers in parenthesis represent the grade designation from the current ISRI Scrap Specifications.

Legacy price source: Prices for grades designated "OBM" are a continuation of the prices originally published in Official Board Markets ("OBM", "The Yellow Sheet") and are reported on the same basis as published historically in OBM. All other prices are consistent with prices published historically in PPW. (See below for details: "Revision history: October 2012 – Integration of OBM prices into PPW")

Reference grade: Grades that have a reference grade listed are less actively traded. These assessments incorporate data from the indicated reference grades -- see "Relative importance of data types in determining assessments" below for details.

RISI Assessment ID: Unique identifier for each price series. Visible when downloading historical prices from Price Watch online.

Assessment regions: See "Geographic definitions" below for a map showing how regions are defined.

Grade name		Legacy source	Reference grades	RISI Assessment ID by assessment region					
As shown in Price Watch	Full name			Northeast	Midwest (Chicago)	Southeast	Southwest	Los Angeles – San Fran Bay Area (LA-SF)	Pacific NW
MIXED PAPER									
Mixed (54)	Mixed Paper (54)			1265 (New England) 1266 (New York) 1260 (Buffalo)	1264	1270	1271	1263 (LA) 1269 (SF)	1268
BROWN GRADES									
Boxb cutt (4)	Boxboard Cuttings (4)	OBM		1254 (New England) 1255 (New York) 1251 (Buffalo)	1253	1258	1259	1252(LA) 1257(SF)	1256
OCC (11)	Old Corrugated Containers (11)	OBM		1302 (New England) 1303 (New York) 1297(Buffalo)	1301	1307	1308	1300(LA) 1306(SF)	1305
DLK (13)	Double-Lined Kraft Corrugated Cuttings (13)	OBM		1274	1273	1277	1278	1272(LA) 1276(SF)	1275
GROUNDWOOD									
SRPN (56)	Old Newspapers (56)			1291 (New England) 1292 (New York) 1288 (Buffalo)	1290	1295	1296	1289(LA) 1294(SF)	1293
OMG (10)	Old Magazines (10)		CGS	315	316	317	319	318	1167
CGS (44)	Coated Groundwood Sections (44)		CGS	374	375	376	378	377	1166
SCN (58)	Sorted Clean News (58)		SCN	11990	11993	11992	11991	11998	11989
WBN (24)	White Blank News (24)		ONP, CGS	330	331	332	334	333	1172
HIGH GRADES									

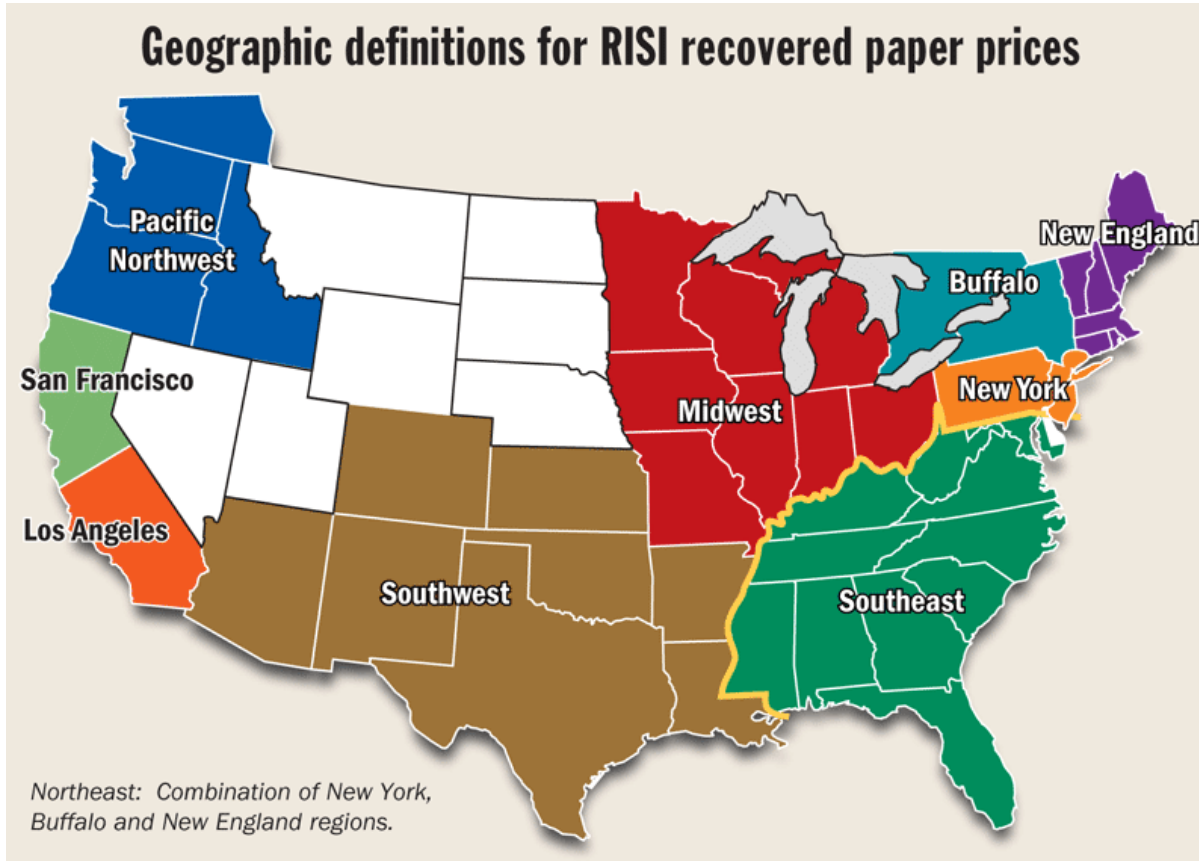
Grade name		Legacy source	Reference grades	RISI Assessment ID by assessment region					
As shown in Price Watch	Full name			Northeast	Midwest (Chicago)	Southeast	Southwest	Los Angeles – San Fran Bay Area (LA-SF)	Pacific NW
SOP (37)	Sorted Office Papers (37)			345	346	347	349	348	1173
CBS (43)	Coated Book Stock (43)			369	370	371	373	372	1165
SBS heavy print (45)	Heavily Printed Bleached Board Cuttings (45)		SOP	384	385	386		387	
SWL (40)	Sorted White Ledger (40)			350	351	352	354	353	1174
MWL (41)	Manifold White Ledger (41)		SWL	360	361	362	364	363	1168
SBS light print (45)	Lightly Printed Bleached Board Cuttings (45)		SWL	379	380	381	383	382	
PULP SUBS									
SBS unprinted (47)	Unprinted Bleached Board (47)		HWEC	388	389	390	392	391	
HWS (30)	Hard White Shavings (30)		HWEC	335	336	337	339	338	
HWEC (31)	Hard White Envelope Cuttings (31)			340	341	342	344	343	1163

Export price assessments

Grade name		Destination	Legacy source	RISI Assessment ID by port of origin			
As shown in Price Watch	Full name			New York	Chicago	Los Angeles (LA)	San Francisco/Oakland
FAS Port of Origin (per ton)							
Mixed Paper (54)	Mixed Paper (54)	China		1267	1261	1262	1321

Grade name		Destination	Legacy source	RISI Assessment ID by port of origin			
As shown in Price Watch	Full name			New York	Chicago	Los Angeles (LA)	San Francisco/Oakland
OCC (11)	Old Corrugated Containers (11)	China	OBM	1304	1298	1299	1320
DLK (13)	Double-Lined Kraft Corrugated Cuttings (13)	China		1037		1024	1319
SRPN (56)	Old Newspapers (56)	China		1311	1309	1310	1326
SOP (37)	Sorted Office Papers (37)	China		1038		1025	1322
SWL (40)	Sorted White Ledger (40)	Asia		1039		1026	1327
CFR to Destination Port (per tonne)							
Mixed Paper (54)	Mixed Paper (54)	China		1040		1027	
OCC (11)	Old Corrugated Containers (11)	China		1042		1029	
Select OCC (11)	Select Old Corrugated Containers (11)	India, Nhava Sheva		1159			
Double-Sorted OCC (12)	Double-Sorted Old Corrugated Containers (11)	India, Nhava Sheva		1160			
DLK (13)	Double-Lined Kraft Corrugated Cuttings (13)	China		1043		1030	
Sorted Residential Paper & News (56)	Old Newspapers (56)	China		1041		1028	
SOP (37)	Sorted Office Papers (37)	China		1044		1031	
SWL (40)	Sorted White Ledger (40)	Asia (ports in South Korea, Indonesia, and Thailand)		1045		1032	

Geographic definitions



REVISION HISTORY

Changes to methodology and specifications are tracked here.

January 2018 – Adds information on corrections and non-market adjustments

Adds information on corrections and non-market adjustments.

November 2017 – Nhava Sheva added to CFR India definitions

The destination port of Nhava Sheva was added to the CFR India definition for Select OCC (11) and OCC (12) on page 11.

October 2017 – Comment added on compliance regime

Comment added on page 5 regarding RISI's current transition to a new compliance regime in the light of its purchase by Euromoney.

August 2017 – Removal of retired assessment grades

The methodology document was updated, removing the retired grades Mixed Paper No. 2 and old newspapers No. 8 (see below) and adding details of a new grade, Sorted Clean News (SCN), No. 58.

September 2016 – Incorporation of ISRI's paper specifications changes

RISI evaluated ISRI's notice of approved changes to the paper specifications announced on April 14, 2016, and conducted market consultation process in September 2016. As a result, the following new grades were introduced:

- Mixed Paper No. 54 grade for both domestic and export markets with 2 years of retroactive price history matching price history of Mixed Paper (2) - OBM
- Sorted Residential Papers No. 56 grade for both domestic and export markets with 2 years of retroactive price history matching price history of ONP (8) - OBM

Mixed Paper (2) - OBM and ONP (8) - OBM grade for both domestic and export markets were set to be discontinued in January 2017.

November 2015 – Incorporation of PRA Principles

A new methodology document was created reflecting improved procedures that incorporate the Principles for Oil Price Reporting Agencies (PRAs) published by IOSCO, the International Organization of Securities Commissions (www.iosco.org).

For more on the Principles and how RISI has applied them, see "Implementation of IOSCO's Principles for Oil Price Reporting Agencies" at www.risi.com/iosco.

These changes involve improvements to our processes and tighter quality controls that will help ensure the consistency of RISI assessments. However, the fundamentals of the methodology have not changed, so assessments made according to this new methodology are comparable to assessments under the previous (October 2012) methodology.

October 2012 – Integration of OBM prices into PPW

PPI Pulp & Paper Week (PPW) and Official Board Markets (OBM) were two separate publications that merged on October 1, 2012.

PPW and OBM reported prices for many of the same grades. As of January 1, 2013, overlapping prices were discontinued. From that point on, prices designated as an "OBM" have represented a continuation of the prices originally published in OBM. For example, OCC is labeled as "OCC (11) - OBM". Prices not designated "OBM" are a continuation of price series that were published by PPW prior to 2013.

With this rationalization of price assessments, the methodology and specifications for assessing prices did not change, so assessments published after January 2013 are comparable over time to those published before. In particular, both OBM and PPW price assessments do not reflect premiums, both before and after January 2013.

