

ROYAL BANK OF CANADA  
Form 424B2  
October 30, 2018

RBC Capital Markets® Filed Pursuant to Rule 424(b)(2)  
Registration Statement No. 333-227001

Pricing Supplement

Dated October 26, 2018

To the Product

Prospectus Supplement \$1,769,000

No. CCBN-1, dated Contingent Coupon Barrier Notes

September 10, 2018, and Linked to the Lesser Performing of One Exchange

the Prospectus Traded Fund and Two Equity Indices,

Supplement and the Due October 29, 2020

Prospectus, Each Dated Royal Bank of Canada

September 7, 2018

Royal Bank of Canada is offering Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of one exchange traded fund and two equity indices (each, a “Reference Asset” and collectively, the “Reference Assets”). The Notes offered are senior unsecured obligations of Royal Bank of Canada, will pay a quarterly Contingent Coupon at the rate and under the circumstances specified below, and will have the terms described in the documents described above, as supplemented or modified by this pricing supplement.

| Reference Assets                                          | Initial Levels | Coupon Barriers and Trigger Levels              |
|-----------------------------------------------------------|----------------|-------------------------------------------------|
| SPDR® S&P® Oil & Gas Exploration & Production ETF (“XOP”) | \$35.92        | \$25.14, which is 70.00% of its Initial Level*  |
| Nikkei 225 Index (“NKY”)                                  | 21,184.60      | 14,829.22, which is 70.00% of its Initial Level |
| EURO STOXX 50® Index (“SX5E”)                             | 3,134.89       | 2,194.42, which is 70.00% of its Initial Level* |

\* Rounded to two decimal places.

The Notes do not guarantee any return of principal at maturity. Any payments on the Notes are subject to our credit risk.

Investing in the Notes involves a number of risks. See “Risk Factors” beginning on page PS-5 of the product prospectus supplement dated September 10, 2018, on page S-1 of the prospectus supplement dated September 7, 2018, and “Selected Risk Considerations” beginning on page P-8 of this pricing supplement.

The Notes will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality. The Notes are not subject to conversion into our common shares under subsection 39.2(2.3) of the Canada Deposit Insurance Corporation Act.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Notes or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

|                    |                               |                         |                               |
|--------------------|-------------------------------|-------------------------|-------------------------------|
| Issuer:            | Royal Bank of Canada          | Stock Exchange Listing: | None                          |
| Trade Date:        | October 26, 2018              | Principal Amount:       | \$1,000 per Note              |
| Issue Date:        | October 31, 2018              | Maturity Date:          | October 29, 2020              |
| Observation Dates: | Quarterly, as set forth below | Coupon Payment Dates:   | Quarterly, as set forth below |
| Valuation Dates:   |                               |                         | 10.46% per annum              |

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Each trading day from October 20, 2020 to October 26, 2020 (both inclusive)      Contingent Coupon Rate:

Contingent Coupon:      If the Observation Level of each Reference Asset is greater than or equal to its Coupon Barrier on the applicable Observation Date (or the Final Level in the case of the final Coupon Payment Date), we will pay the Contingent Coupon on the applicable Coupon Payment Date. You may not receive any Contingent Coupons during the term of the Notes.  
We will pay you at maturity an amount based on the Final Level of the Lesser Performing Reference Asset:

Payment at Maturity (if held to maturity):      For each \$1,000 in principal amount, \$1,000 plus the Contingent Coupon at maturity, unless the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level.  
If the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, then the investor will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  
\$1,000 + (\$1,000 x Reference Asset Return of the Lesser Performing Reference Asset)  
Investors in the Notes could lose some or all of their principal amount if the Final Level of the Lesser Performing Reference Asset is below its Trigger Level.

Lesser Performing Reference Asset:      The Reference Asset with the lowest Reference Asset Return.

Observation Level:      For the XOP, its closing price, and for each of the NKY and the SX5E, its closing level, on any Observation Date

Final Level:      For the XOP, the arithmetic average of its closing price, for the NKY and the SX5E, the arithmetic average of their respective closing levels, on the Valuation Dates.

Call Feature:      The Notes are not callable at our option prior to maturity, and are not subject to automatic call.

CUSIP:      78013XQ92

|                                                       | Per Note | Total       |
|-------------------------------------------------------|----------|-------------|
| Price to public                                       | 100.00%  | \$1,769,000 |
| Underwriting discounts and commissions <sup>(1)</sup> | 1.50%    | \$26,535    |
| Proceeds to Royal Bank of Canada                      | 98.50%   | \$1,742,465 |

<sup>(1)</sup> JPMorgan Chase Bank, N.A., J.P. Morgan Securities LLC and their affiliates will act as placement agents for the Notes and will receive a fee from the Issuer of \$15 per \$1,000 in principal amount of the Notes.

The initial estimated value of the Notes as of the date of this pricing supplement is \$955.36 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Notes at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value in more detail below.

RBC Capital Markets, LLC      JPMorgan Chase Bank, N.A.      J.P. Morgan Securities LLC  
Placement Agents

Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

SUMMARY

The information in this “Summary” section is qualified by the more detailed information set forth in this pricing supplement, the product prospectus supplement, the prospectus supplement, and the prospectus.

This pricing supplement relates to an offering of Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of the following (each, a “Reference Asset”, and collectively, the “Reference Assets”):

General: (i) the shares of SPDR<sup>®</sup> S&P<sup>®</sup> Oil & Gas Exploration & Production ETF (“XOP”);  
(ii) the Nikkei 225 Index (the “NKY”); and  
(iii) the EURO STOXX 50<sup>®</sup> Index (“SX5E,” and together with the NKY, the “Indices”).  
See “Additional Terms of your Notes Related to Indices” below, which relates to the Indices.

Issuer: Royal Bank of Canada (“Royal Bank”)  
Issue: Senior Global Medium-Term Notes, Series H  
Trade Date: October 26, 2018  
Issue Date: October 31, 2018  
Denominations: Minimum denomination of \$1,000, and integral multiples of \$1,000 thereafter.  
Designated Currency: U.S. Dollars

We will pay you a Contingent Coupon during the term of the Notes, periodically in arrears on each Coupon Payment Date, under the conditions described below:

Contingent Coupon: · If the Observation Level of each Reference Asset is greater than or equal to its Coupon Barrier on the applicable Observation Date (or in the case of the final Contingent Coupon, the Final Level), we will pay the Contingent Coupon applicable to that Observation Date.  
· If the Observation Level of any Reference Asset is less than its Coupon Barrier on the applicable Observation Date, we will not pay you the Contingent Coupon applicable to that Observation Date.  
You may not receive a Contingent Coupon for one or more quarterly periods during the term of the Notes.

Contingent Coupon Rate: 10.46% per annum (2.615% per quarter)  
Observation Dates: Quarterly on January 28, 2019, April 26, 2019, July 26, 2019, October 28, 2019, January 27, 2020, April 27, 2020, July 27, 2020 and October 26, 2020.  
The Contingent Coupon, if applicable, will be paid quarterly on January 31, 2019, May 1, 2019, July 31, 2019, October 31, 2019, January 30, 2020, April 30, 2020, July 30, 2020 and the Maturity Date.  
The record date for each Coupon Payment Date will be the date one business day prior to that scheduled Coupon Payment Date; provided, however, that any Contingent Coupon payable at maturity will be payable to the person to whom the payment at maturity will be payable.

Record Dates: Each trading day from and including October 20, 2020 to and including October 26, 2020.  
Maturity Date: October 29, 2020  
Initial Level: For the XOP, its closing price, and for the NKY and the SX5E, its closing level, on the Trade Date, as specified on the cover page of this pricing supplement.  
Final Level: For the XOP, the arithmetic average of its closing prices, and for the NKY and the SX5E, the arithmetic average of their respective closing levels, on each Valuation Date.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
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Royal Bank of Canada

Observation Level: For the XOP, its closing price, and for the NKY and the SX5E, its closing level, on any Observation Date.

Trigger Level and Coupon Barrier: For each Reference Asset, 70.00% of its Initial Level, as specified on the cover page of this pricing supplement.

Payment at Maturity (if held to maturity): We will pay you at maturity an amount based on the Final Level of the Lesser Performing Reference Asset:

- If the Final Level of the Lesser Performing Reference Asset is greater than or equal to its Trigger Level, we will pay you a cash payment equal to the principal amount plus the Contingent Coupon otherwise due on the Maturity Date.
- If the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, you will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  $\$1,000 + (\$1,000 \times \text{Reference Asset Return of the Lesser Performing Reference Asset})$

The amount of cash that you receive will be less than your principal amount, if anything, resulting in a loss that is proportionate to the decline of the Lesser Performing Reference Asset from the Trade Date to each Valuation Date. Investors in the Notes could lose some or all of their principal amount if the Final Level of the Lesser Performing Reference Asset is below its Trigger Level.

Stock Settlement: Not applicable. Payments on the Notes will be made solely in cash.

Reference Asset Return: With respect to each Reference Asset:  
 $\frac{\text{Final Level} - \text{Initial Level}}{\text{Initial Level}}$

Lesser Performing Reference Asset: The Reference Asset with the lowest Reference Asset Return.

Call Feature: None. The Notes are not callable at our option prior to maturity, and are not subject to an automatic call.

Market Disruption Events: The occurrence of a market disruption event (or a non-trading day) as to any of the Reference Assets will result in the postponement of an Observation Date or any Valuation Date as to that Reference Asset, as described in the product prospectus supplement, but not to any non-affected Reference Asset.

If a market disruption event occurs or is continuing on any scheduled Valuation Date other than the final Valuation Date, the closing value of the applicable Reference Asset for that Valuation Date will equal its closing value on the next scheduled Valuation Date. For example, if a market disruption event occurs or is continuing on the first and second scheduled Valuation Dates, but not on the third scheduled Valuation Date, then the closing value of the applicable Reference Asset will also be deemed to be the closing value of such Reference Asset on the first and second scheduled Valuation Dates. If no further scheduled Valuation Dates occur after a Valuation Date on which a market disruption event occurs or is continuing or if a market disruption event occurs or is continuing on the final Valuation Date, then the applicable closing value for that Valuation Date will be determined (or, if not determinable, estimated by the calculation agent in a manner which is considered to be commercially reasonable under the circumstances) by the calculation agent on that final Valuation Date, regardless of the occurrence or continuation of a market disruption event on that day. In such an event, the calculation agent will make a good faith estimate in its sole discretion of the closing value of the applicable Reference Asset that would

have prevailed in the absence of the market disruption event.

Calculation Agent: RBC Capital Markets, LLC (“RBCCM”)

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|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| U.S. Tax Treatment:                    | By purchasing a Note, each holder agrees (in the absence of a change in law, an administrative determination or a judicial ruling to the contrary) to treat the Note as a pre-paid cash-settled contingent income-bearing derivative contract in respect of the Reference Assets for U.S. federal income tax purposes. However, the U.S. federal income tax consequences of your investment in the Notes are uncertain and the Internal Revenue Service could assert that the Notes should be taxed in a manner that is different from that described in the preceding sentence. Please see the section below, “Supplemental Discussion of U.S. Federal Income Tax Consequences,” and the discussion (including the opinion of our counsel Morrison & Foerster LLP) in the product prospectus supplement dated September 10, 2018 under “Supplemental Discussion of U.S. Federal Income Tax Consequences,” which apply to the Notes. |
| Secondary Market:                      | RBCCM (or one of its affiliates), though not obligated to do so, may maintain a secondary market in the Notes after the Issue Date. The amount that you may receive upon sale of your Notes prior to maturity may be less than the principal amount.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Listing:                               | The Notes will not be listed on any securities exchange.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Settlement:                            | DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus dated September 7, 2018).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Terms Incorporated in the Master Note: | All of the terms appearing above the item captioned “Secondary Market” on the cover page and pages P-2 and P-3 of this pricing supplement and the terms appearing under the caption “General Terms of the Notes” in the product prospectus supplement dated September 10, 2018, as modified by this pricing supplement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

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Royal Bank of Canada

ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated September 7, 2018, as supplemented by the prospectus supplement dated September 7, 2018 and the product prospectus supplement dated September 10, 2018, relating to our Senior Global Medium-Term Notes, Series H, of which these Notes are a part. Capitalized terms used but not defined in this pricing supplement will have the meanings given to them in the product prospectus supplement. In the event of any conflict, this pricing supplement will control. The Notes vary from the terms described in the product prospectus supplement in several important ways. You should read this pricing supplement carefully, including “- Additional Terms Relating to the Indices” below, which relate to the NKY and the SX5E. In addition, the Notes are not callable at our option prior to maturity, and are not subject to an automatic call.

This pricing supplement, together with the documents listed below, contains the terms of the Notes and supersedes all prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the prospectus supplement dated September 7, 2018 and in the product prospectus supplement dated September 10, 2018, as the Notes involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisors before you invest in the Notes. You may access these documents on the Securities and Exchange Commission (the “SEC”) website at [www.sec.gov](http://www.sec.gov) as follows (or if that address has changed, by reviewing our filings for the relevant date on the SEC website):

Prospectus dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005973/196181424b3.htm>

Prospectus Supplement dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005975/f97180424b3.htm>

Product Prospectus Supplement dated September 10, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036118038091/form424b5.htm>

Our Central Index Key, or CIK, on the SEC website is 1000275. As used in this pricing supplement, “we,” “us,” or “our” refers to Royal Bank of Canada.

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HYPOTHETICAL EXAMPLES

The table set out below is included for illustration purposes only. The table illustrates the Payment at Maturity of the Notes (including the final Contingent Coupon, if payable) for a hypothetical range of performance for the Lesser Performing Reference Asset, assuming the following terms:

|                                                |                                                                         |
|------------------------------------------------|-------------------------------------------------------------------------|
| Hypothetical Trigger Level and Coupon Barrier: | 70.00% of the hypothetical Initial Level of the Lesser Performing Asset |
| Contingent Coupon Rate:                        | 10.46% per annum (or 2.615% per quarter)                                |
| Contingent Coupon Amount:                      | \$26.15 per quarter                                                     |
| Observation Dates:                             | Quarterly                                                               |
| Principal Amount:                              | \$1,000 per Note                                                        |

We make no representation or warranty as to which of the Reference Assets will be the Lesser Performing Reference Asset. It is possible that the Final Level of each Reference Asset will be less than its Initial Level.

Hypothetical Final Levels of the Lesser Performing Reference Asset, expressed as a percentage of its Initial Level, are shown in the first column on the left. The second column shows the Payment at Maturity for a range of Reference Asset Returns. The third column shows the amount of cash to be paid on the Notes per \$1,000 in principal amount.

| Final Level of the Lesser Performing Reference Asset | Payment at Maturity as Percentage of Principal Amount | Cash Payment Amount per \$1,000 in Principal Amount |
|------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|
| 150.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 140.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 130.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 120.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 110.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 100.00%                                              | 102.615%                                              | \$1,026.15*                                         |
| 90.00%                                               | 102.615%                                              | \$1,026.15*                                         |
| 85.00%                                               | 102.615%                                              | \$1,026.15*                                         |
| 80.00%                                               | 102.615%                                              | \$1,026.15*                                         |
| 70.00%                                               | 102.615%                                              | \$1,026.15*                                         |
| 69.99%                                               | 69.99%                                                | \$699.90                                            |
| 60.00%                                               | 60.00%                                                | \$600.00                                            |
| 50.00%                                               | 50.00%                                                | \$500.00                                            |
| 40.00%                                               | 40.00%                                                | \$400.00                                            |
| 25.00%                                               | 25.00%                                                | \$250.00                                            |
| 0.00%                                                | 0.00%                                                 | \$0.00                                              |

\*Including the final Contingent Coupon, if payable.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
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Hypothetical Examples of Amounts Payable at Maturity

The following hypothetical examples illustrate how the payments at maturity set forth in the table above are calculated.

Example 1: The Final Level of the Lesser Performing Reference Asset is 120%, an increase of 20% from its Initial Level. Because the Final Level of the Lesser Performing Reference Asset is greater than its Trigger Level and Coupon Barrier, the investor receives at maturity, in addition to the final Contingent Coupon otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 20% appreciation in the value of the Lesser Performing Reference Asset.

Example 2: The Final Level of the Lesser Performing Reference Asset is 90.00%, a decrease of 10% from its Initial Level. Because the Final Level of the Lesser Performing Reference Asset is greater than its Trigger Level and Coupon Barrier, the investor receives at maturity, in addition to the final Contingent Coupon otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 10% decline in the value of the Lesser Performing Reference Asset.

Example 3: The Final Level of the Lesser Performing Reference Asset is 50.00%, which is less than its Trigger Level and Coupon Barrier. Because the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level and Coupon Barrier, the final Contingent Coupon will not be payable on the Maturity Date, and we will pay only \$500.00 for each \$1,000 in the principal amount of the Notes, calculated as follows:

Principal Amount + (Principal Amount x Reference Asset Return of the Lesser Performing Reference Asset)  
= \$1,000 + (\$1,000 x -50.00%) = \$1,000 - \$500.00 = \$500.00

\* \* \*

The Payments at Maturity shown above are entirely hypothetical; they are based on values of the Reference Assets that may not be achieved on any Valuation Date and on assumptions that may prove to be erroneous. The actual market value of your Notes on the Maturity Date or at any other time, including any time you may wish to sell your Notes, may bear little relation to the hypothetical Payments at Maturity shown above, and those amounts should not be viewed as an indication of the financial return on an investment in the Notes or on an investment in any Reference Asset or the securities included in any of the Reference Assets.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

**SELECTED RISK CONSIDERATIONS**

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the Reference Assets. These risks are explained in more detail in the section “Risk Factors” in the product prospectus supplement. In addition to the risks described in the prospectus supplement and the product prospectus supplement, you should consider the following:

**Principal at Risk** — Investors in the Notes could lose all or a substantial portion of their principal amount if there is a decline in the value of the Lesser Performing Reference Asset between the Trade Date and the Valuation Dates. If the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, the amount of cash that you receive at maturity will represent a loss of your principal that is proportionate to the decline in the closing price or closing level, as applicable, of the Lesser Performing Reference Asset from the Trade Date to its Final Level. Any Contingent Coupons received on the Notes prior to the Maturity Date may not be sufficient to compensate for any such loss.

**You May Not Receive Any Contingent Coupons** — We will not necessarily make any coupon payments on the Notes. If the Observation Level of one or more Reference Assets on an Observation Date (or in the case of the final Contingent Coupon, the Final Level) is less than the Coupon Barrier, we will not pay you the applicable Contingent Coupon. It is possible that you will not receive any Contingent Coupons during the term of the Notes.

**The Contingent Coupon Feature Limits Your Potential Return** — The return potential of the Notes is limited to the pre-specified Contingent Coupon Rate, regardless of the appreciation of any Reference Asset. In addition, the total return on the Notes will vary based on the number of Observation Dates on which the Contingent Coupon becomes payable prior to maturity. You may be subject to the full downside performance of the Lesser Performing Reference Asset, even though your potential return is limited to the Contingent Coupon Rate. As a result, the return on an investment in the Notes could be less than the return on a direct investment in securities included in one or more of the Reference Assets.

**Your Redemption Amount Will Be Determined Solely by Reference to the Lesser Performing Reference Asset, Even if the Other Reference Assets Perform Better** — If any of the Reference Assets has a Final Level that is less than its Trigger Level, your return will be linked to the lesser performing of the three Reference Assets. Even if the Final Levels of the other Reference Assets have increased compared to their respective Initial Levels, or have experienced a decrease that is less than that of the Lesser Performing Reference Asset, your return will only be determined by reference to the performance of the Lesser Performing Reference Asset, regardless of the performance of the other Reference Assets.

**Your Payment on the Notes Will Be Determined by Reference to Each Reference Asset Individually, Not to a Basket, and the Payment at Maturity Will Be Based on the Performance of the Lesser Performing Reference Asset** — The Payment at Maturity will be determined only by reference to the performance of the Lesser Performing Reference Asset, regardless of the performance of the other Reference Assets. The Notes are not linked to a weighted basket, in which the risk may be mitigated and diversified among each of the basket components. For example, in the case of notes linked to a weighted basket, the return would depend on the weighted aggregate performance of the basket components reflected as the basket return. As a result, the depreciation of one basket component could be mitigated by the appreciation of the other basket components, as scaled by the weighting of that basket component. However, in the case of the Notes, the individual performance of each of the Reference Assets would not be combined, and the depreciation of one Reference Asset would not be mitigated by any appreciation of the other Reference Assets. Instead, your return will depend solely on the Final Level of the Lesser Performing Reference Asset.

**Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — The return that you will receive on the Notes, which could be negative, may be less than the return you could earn on other investments. Even if your return is positive, your return may be less than the return you would earn if you bought a

conventional senior interest bearing debt security of Royal Bank.

Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes — The Notes are our senior unsecured debt securities. As a result, your receipt of any Contingent Coupons, if payable, and the amount due on any relevant payment date is dependent upon our ability to repay its obligations on the applicable payment dates. This will be the case even if the values of the Reference Assets increase after the Trade Date. No assurance can be given as to what our financial condition will be at any time during the term of the Notes.

There May Not Be an Active Trading Market for the Notes-Sales in the Secondary Market May Result in Significant Losses — There may be little or no secondary market for the Notes. The Notes will not be listed on any securities exchange. RBCCM and our other affiliates may make a market for the Notes; however, they are not required to do so. RBCCM or any other affiliate of ours may stop any market-making activities at any time. Even if a secondary market for the Notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your Notes in any secondary market could be substantial.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
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Royal Bank of Canada

The Initial Estimated Value of the Notes Is Less than the Price to the Public — The initial estimated value set forth on the cover page of this pricing supplement does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the Notes in any secondary market (if any exists) at any time. If you attempt to sell the Notes prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the prices or levels of the Reference Assets, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and the estimated costs relating to our hedging of the Notes. These factors, together with various credit, market and economic factors over the term of the Notes, are expected to reduce the price at which you may be able to sell the Notes in any secondary market and will affect the value of the Notes in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Notes prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the underwriting discount and the hedging costs relating to the Notes. In addition to bid-ask spreads, the value of the Notes determined by RBCCM for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the Notes and determine the initial estimated value. As a result, the secondary price will be less than if the internal funding rate was used. The Notes are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Notes to maturity. The Initial Estimated Value of the Notes on the Cover Page of this Pricing Supplement Is an Estimate Only, Calculated as of the Time the Terms of the Notes Were Set — The initial estimated value of the Notes is based on the value of our obligation to make the payments on the Notes, together with the mid-market value of the derivative embedded in the terms of the Notes. See “Structuring the Notes” below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Notes. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Notes or similar securities at a price that is significantly different than we do. The value of the Notes at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Notes in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Notes.

Owning the Notes Is Not the Same as Owning the Reference Assets or the Securities Represented by the Reference Assets — The return on your Notes is unlikely to reflect the return you would realize if you actually owned shares of the XOP, or the securities represented by the Reference Assets. For instance, you will not receive or be entitled to receive any dividend payments or other distributions on these securities during the term of your Notes. As an owner of the Notes, you will not have voting rights or any other rights that holders of these securities may have. Furthermore, the Reference Assets may appreciate substantially during the term of the Notes, while your potential return will be limited to the applicable Contingent Coupon payments.

Prior to Maturity, the Value of the Notes Will Be Influenced by Many Unpredictable Factors — Many economic and market factors will influence the value of the Notes. We expect that, generally, the price or level of each Reference Asset on any day will affect the value of the Notes more than any other single factor. However, you should not expect the value of the Notes in the secondary market to vary in proportion to changes in the value of the Reference Assets. The value of the Notes will be affected by a number of other factors that may either offset or magnify each other, including:

- Øthe market value of the Reference Assets;
- Øwhether the market value of one or more of the Reference Assets is below the Coupon Barrier or the Trigger Level;
- Øthe expected volatility of the Reference Assets;
- Øthe time to maturity of the Notes;

- Ø the dividend rate on the Reference Assets or on the equity securities represented by the Reference Assets;
- Ø interest and yield rates in the market generally, as well as in the markets of the equity securities represented by the Reference Assets;
- Ø the occurrence of certain events relating to a Reference Asset that may or may not require an adjustment to the Initial Level, the Coupon Barrier and the Trigger Level;
- Ø economic, financial, political, regulatory or judicial events that affect the Reference Assets or the equity securities represented by the Reference Assets or stock markets generally, and which may affect the market value of the Reference Assets on any Observation Date;
- Ø the exchange rates and the volatility of the exchange rates between the U.S. dollar and the currencies in which the equity securities represented by the NKY and the SX5E are traded; and

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Our creditworthiness, including actual or anticipated downgrades in our credit ratings.

Some or all of these factors will influence the price you will receive if you choose to sell your Notes prior to maturity. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You may have to sell your Notes at a substantial discount from the principal amount if the market value of the Reference Assets is at, below or not sufficiently above their Initial Levels, the Coupon Barriers or the Trigger Levels.

**Our Business Activities May Create Conflicts of Interest** — We and our affiliates expect to engage in trading activities related to the securities included in or represented by the Reference Assets that are not for the account of holders of the Notes or on their behalf. These trading activities may present a conflict between the holders' interests in the Notes and the interests we and our affiliates will have in their proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for their customers and in accounts under their management. These trading activities, if they influence the prices or levels of the Reference Assets, could be adverse to the interests of the holders of the Notes. We and one or more of our affiliates may, at present or in the future, engage in business with the securities included in or represented by the Reference Assets, including making loans to or providing advisory services. These services could include investment banking and merger and acquisition advisory services. These activities may present a conflict between our or one or more of our affiliates' obligations and your interests as a holder of the Notes. Moreover, we, and our affiliates may have published, and in the future expect to publish, research reports with respect to the Reference Assets or securities included in or represented by the Reference Assets. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding the Notes. Any of these activities by us or one or more of our affiliates may affect the prices or levels of the Reference Assets and, therefore, the market value of the Notes.

**Market Disruption Events and Adjustments** — The Payment at Maturity, each Observation Date and the Valuation Dates are subject to adjustment as to each Reference Asset as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see "General Terms of the Notes—Market Disruption Events" in the product prospectus supplement and the section "Additional Terms of the Notes" below.

**You Must Rely on Your Own Evaluation of the Merits of an Investment Linked to the Reference Assets** — In the ordinary course of their business, our affiliates may have expressed views on expected movements in the Reference Assets or the equity securities that they represent, and may do so in the future. These views or reports may be communicated to our clients and clients of our affiliates. However, these views are subject to change from time to time. Moreover, other professionals who transact business in markets relating to any Reference Asset may at any time have significantly different views from those of our affiliates. For these reasons, you are encouraged to derive information concerning the Reference Assets from multiple sources, and you should not rely solely on views expressed by our affiliates.

**The XOP and Its Underlying Index Are Different** — The performance of the XOP may not exactly replicate the performance of its underlying index, because the XOP will reflect transaction costs and fees that are not included in the calculation of that index. It is also possible that the performance of the XOP may not fully replicate or may in certain circumstances diverge significantly from the performance of its underlying index due to the temporary unavailability of certain securities in the secondary market, the performance of any derivative instruments owned by the XOP or due to other circumstances. The XOP may use futures contracts, options, swap agreements, currency forwards and repurchase agreements in seeking performance that corresponds to its underlying index and in managing cash flows.

During periods of market volatility, securities underlying the XOP may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of the XOP and its liquidity

may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of the XOP. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of the XOP. As a result, under these circumstances, the market value of shares of the XOP may vary substantially from its net asset value per share. For all of the foregoing reasons, the performance of the XOP may not correlate with the performance of its underlying index as well as its net asset value, which could materially and adversely affect the value of the Notes in the secondary market and/or reduce your payment at maturity.

**Management Risk** — The XOP is not managed according to traditional methods of “active” investment management, which involve the buying and selling of securities based on economic, financial and market analysis and investment judgment. Instead, the XOP, utilizing a “passive” or indexing investment approach, attempts to approximate the investment performance of its underlying index by investing in a portfolio of securities that generally replicate its underlying index. Therefore, unless a specific security is removed from its underlying index, the XOP generally would not sell a security because the security’s issuer was in financial trouble. In addition, the XOP is subject to the risk that the investment strategy of its investment advisor may not produce the intended results.

**We and Our Affiliates Do Not Have Any Affiliation with the Advisor or the Sponsor of any Reference Assets or the Underlying Indices and Are Not Responsible for its Public Disclosure of Information** — We and our affiliates are not affiliated with the investment advisors or the sponsors of the Reference Assets or the underlying index of the XOP in any way and

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have no ability to control or predict their actions, including any errors in or discontinuance of disclosure regarding their methods or policies relating to these Reference Assets or underlying indices. The investment advisor or the sponsor of any of these Reference Assets or underlying indices are not involved in the offering of the Notes in any way and has no obligation to consider your interests as an owner of the Notes in taking any actions relating to the Reference Assets that might affect the value of the Notes, including changes to their methodologies. Neither we nor any of our affiliates has independently verified the adequacy or accuracy of the information about the investment advisor, the sponsor, or the Reference Assets or the underlying indices contained in any public disclosure of information. You, as an investor in the Notes, should make your own investigation into the Reference Assets.

**An Investment in Notes Linked to the NKY and the SX5E Is Subject to Risks Associated with Foreign Securities Markets** — The NKY and the SX5E track the value of certain foreign equity securities. You should be aware that investments in securities linked to the value of foreign equity securities involve particular risks. The foreign securities markets represented by the NKY and the SX5E may have less liquidity and may be more volatile than U.S. or other securities markets and market developments may affect foreign markets differently from U.S. or other securities markets. Direct or indirect government intervention to stabilize these foreign securities markets, as well as cross-shareholdings in foreign companies, may affect trading prices and volumes in these markets. Also, there is generally less publicly available information about foreign companies than about those U.S. companies that are subject to the reporting requirements of the U.S. Securities and Exchange Commission, and foreign companies are subject to accounting, auditing and financial reporting standards and requirements that differ from those applicable to U.S. reporting companies.

Prices of securities in foreign countries are subject to political, economic, financial and social factors that apply in those geographical regions. These factors, which could negatively affect those securities markets, include the possibility of recent or future changes in a foreign government's economic and fiscal policies, the possible imposition of, or changes in, currency exchange laws or other laws or restrictions applicable to foreign companies or investments in foreign equity securities and the possibility of fluctuations in the rate of exchange between currencies, the possibility of outbreaks of hostility and political instability and the possibility of natural disaster or adverse public health developments in the region. Moreover, foreign economies may differ favorably or unfavorably from the U.S. economy in important respects such as growth of gross national product, rate of inflation, capital reinvestment, resources and self-sufficiency.

**As a Holder of the Notes, You Will Not Have Direct Exposure to Fluctuations in the U Exchange Rates Related to the NKY and the SX5E** — The value of the Notes will not be adjusted for exchange rate fluctuations between the U.S. dollar and the Japanese yen, and the U.S. dollar and the euro, even though any currency fluctuations could affect the performance of the NKY and/or the SX5E. Therefore, if the Japanese yen or the euro appreciates or depreciates relative to the U.S. dollar over the term of the Notes, you will not receive any additional payment or incur any reduction in any payment on the Notes.

**The Securities Composing the Underlying Index of the XOP Are Concentrated in One Sector** — All of the securities included in the XOP are issued by companies in a single sector, namely, the energy sector. As a result, the securities that will determine the performance of the XOP and the level of its underlying index, are concentrated in one sector. Although an investment in the Notes will not give holders any ownership or other direct interests in the securities composing an underlying index, the return on an investment in the Notes will be subject to certain risks associated with a direct equity investment in companies in this market sector. Accordingly, by investing in the Notes, you may not benefit from the diversification which could result from an investment linked to companies that operate in multiple sectors.

**The Stocks of Companies in the Energy Sector Are Subject to Swift Price Fluctuations** -The issuers of the stocks held by the XOP develop and produce, among other things, crude oil and natural gas, and provide, among other things,

drilling services and other services related to energy resources production and distribution. Stock prices for these types of companies are affected by supply and demand both for their specific product or service and for energy products in general. The price of oil and gas, exploration and production spending, government regulation, world events and economic conditions will likewise affect the performance of these companies. The stock prices of oil service companies could be subject to wide fluctuations in response to a variety of factors, including the ability of the OPEC to set and maintain production levels and pricing, the level of production in non-OPEC countries, the demand for oil and gas, which is negatively impacted by economic downturns, the policies of various governments regarding exploration and development of oil and gas reserves, advances in exploration and development technology and the political environment of oil-producing regions. Correspondingly, securities of companies in the energy field are subject to swift price and supply fluctuations caused by events relating to international politics, energy conservation, the success of exploration projects and tax and other governmental regulatory policies. Weak demand for the companies' products or services or for energy products and services in general, as well as negative developments in these other areas, would adversely impact the value of the stocks held by the XOP and, therefore, the price of the XOP and the value of the Notes.

While the securities included in the XOP are common stocks of companies generally considered to be involved in various segments of the energy sector, the securities included in the XOP may not follow the price movements of the entire energy sector generally. If the securities included in the Energy Select Sector Index decline in value, the XOP will decline in value even if security prices in the energy sector generally increase in value.

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ADDITIONAL TERMS OF YOUR NOTES RELATED TO INDICES

Closing Level

The closing level of each Index on any trading day will equal its closing level published following the regular official weekday close of trading on that trading day.

A “trading day” as to an Index means a day on which its principal trading market is open for trading.

Unavailability of the Level of an Index

If the sponsor of an Index discontinues its publication and its sponsor or another entity publishes a successor or substitute index that the calculation agent determines, in its sole discretion, to be comparable to that Index (such successor or substitute index being referred to in this section as a “successor index”), then any subsequent index closing level will be determined by reference to the published level of that successor index at the regular weekday close of trading on the applicable trading day.

Upon any selection by the calculation agent of a successor index, the calculation agent will provide written notice to the trustee of the selection, and the trustee will furnish written notice thereof, to the extent the trustee is required to under the senior debt indenture, to each noteholder, or in the case of global notes, the depositary, as holder of the global notes.

If a successor index is selected by the calculation agent, that successor index will be used as a substitute for the applicable Index for all purposes, including for purposes of determining whether a market disruption event exists with respect to that Index.

If the sponsor of an Index discontinues its publication prior to, and that discontinuance is continuing on, any trading day on which the level of that Index must be determined, and the calculation agent determines, in its sole discretion, that no successor index is available at that time, then the calculation agent will determine the level of the Index for the relevant date in accordance with the formula for and method of calculating the Index last in effect prior to the discontinuance, without rebalancing or substitution, using the closing level (or, if trading in the relevant underlying securities or components of the Index have been materially suspended or materially limited, its good faith estimate of the closing level that would have prevailed but for that suspension or limitation) at the close of the principal trading session of the relevant exchange on that date of each security or component most recently comprising the Index. Notwithstanding these alternative arrangements, discontinuance of the publication of the Index may adversely affect the value of your Notes.

If at any time the method of calculating a closing level for an Index or a successor index is changed in a material respect, or if such index is in any other way modified so that it does not, in the opinion of the calculation agent, fairly represent its level had those changes or modifications not been made, then, from and after that time, the calculation agent will, at the close of business in New York City on the applicable trading day, make such calculations and adjustments as, in the good faith judgment of the calculation agent, may be necessary in order to arrive at a level of an index comparable to such index as if those changes or modifications had not been made. Accordingly, if the method of calculating an index is modified so that the level of that index is a fraction of what it would have been if it had not been modified (e.g., due to a split in that index), then the calculation agent will adjust the level of that index in order to arrive at a level of that index as if it had not been modified (e.g., as if such split had not occurred).

Index Market Disruption Events

A “market disruption event” with respect to an Index or a successor index means any event, circumstance or cause which we determine, and the calculation agent confirms, has or will have a material adverse effect on our ability to perform our obligations under the Notes or to hedge our position in respect of our obligations to make payment of amounts owing thereunder and more specifically includes the following events to the extent that they have such effect with respect to that index:

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a suspension, absence or limitation of trading in index components constituting 20% or more, by weight, of such index;

a suspension, absence or limitation of trading in futures or options contracts relating to an index on their respective markets;

any event that disrupts or impairs, as determined by the calculation agent, the ability of market participants to (i) effect transactions in, or obtain market values for, index components constituting 20% or more, by weight, of such index, or (ii) effect transactions in, or obtain market values for, futures or options contracts relating to such index on their respective markets;

the closure on any day of the primary market for futures or options contracts relating to such index or index components constituting 20% or more, by weight, of such index on a scheduled trading day prior to the scheduled weekday closing time of that market (without regard to after hours or any other trading outside of the regular trading session hours) unless such earlier closing time is announced by the primary market at least one hour prior to the earlier of (i) the actual closing time for the regular trading session on such primary market on such scheduled trading day for such primary market and (ii) the submission deadline for orders to be entered into the relevant exchange system for execution at the close of trading on such scheduled trading day for such primary market;

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any scheduled trading day on which (i) the primary markets for index components constituting 20% or more, by weight, of such index or (ii) the exchanges or quotation systems, if any, on which futures or options contracts on such index are traded, fails to open for trading during its regular trading session; or any other event, if the calculation agent determines in its sole discretion that the event interferes with our ability or the ability of any of our affiliates to unwind all or a portion of a hedge with respect to the Notes that we or our affiliates have effected or may effect.

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INFORMATION REGARDING THE REFERENCE ASSETS

We have derived the following information regarding each of the Reference Assets from publicly available documents. We have not independently verified the accuracy or completeness of the following information. The selection of the Reference Assets is not a recommendation to buy or sell the shares of any security. Neither we nor any of our affiliates make any representation to you as to the performance of any of the Reference Assets.

Information provided to or filed with the SEC under the Securities Exchange Act of 1934 and the Investment Company Act of 1940 relating to the XOP may be obtained through the SEC's website at <http://www.sec.gov>. SPDR® S&P® Oil & Gas Exploration & Production ETF ("XOP")

The XOP is an investment portfolio maintained and managed by SSgA Funds Management, Inc. ("SSFM"). SSFM is the investment advisor to separate investment portfolios, including the Reference Asset. The XOP seeks to provide investment results that correspond generally to the price and yield performance, before fees and expenses, of the S&P® Oil & Gas Exploration & Production Select Industry® Index (the "underlying index"). The underlying index represents the oil and gas exploration and production sub-industry portion of the S&P Total Market Index, which measures the performance of the U.S. equity market. The XOP is composed of companies that are in the oil and gas sector exploration and production. The XOP trades on the NYSE Arca under the ticker symbol "XOP." The inception date of the Fund is June 19, 2006.

The XOP utilizes a "replication" investment approach in attempting to track the performance of the underlying index. The XOP typically invests in substantially all of the securities which comprise the underlying index in approximately the same proportions as the underlying index. The XOP will normally invest at least 80% of its total assets in the common stocks that comprise the underlying index.

S&P® Oil & Gas Exploration & Production Select Industry® Index

We have derived all information contained in this document regarding the underlying index, including, without limitation, its make-up, method of calculation and changes in its components, from publicly available information. Such information reflects the policies of, and is subject to change by, Standard & Poor's ("S&P").

The underlying index is an equal-weighted index that is designed to measure the performance of the oil and gas exploration and production sub-industry portion of the S&P Total Market Index ("TMI"). The S&P TMI includes all U.S. common equities listed on the New York Stock Exchange ("NYSE") (including NYSE Arca), the NYSE American, the Nasdaq Global Select Market, and the Nasdaq Capital Market. Each of the component stocks in the underlying index is a constituent company within the oil and gas exploration and production sub-industry portion of the S&P TMI.

To be eligible for inclusion in the underlying index, companies must be in the S&P TMI and must be included in the relevant Global Industry Classification Standard (GICS) sub-industry. The GICS was developed to establish a global standard for categorizing companies into sectors and industries. In addition to the above, companies must satisfy one of the two following combined size and liquidity criteria:

- float-adjusted market capitalization above US\$500 million and float-adjusted liquidity ratio above 90%; or
- float-adjusted market capitalization above US\$400 million and float-adjusted liquidity ratio above 150%.

All U.S. companies satisfying these requirements are included in the underlying index. The total number of companies in the underlying index should be at least 35. If there are fewer than 35 stocks, stocks from a supplementary list of highly correlated sub-industries that meet the market capitalization and liquidity thresholds above are included in order of their float-adjusted market capitalization to reach 35 constituents. Minimum market capitalization requirements may be relaxed to ensure there are at least 22 companies in the underlying index as of each rebalancing

effective date.

Eligibility factors include:

Market Capitalization: Float-adjusted market capitalization should be at least US\$400 million for inclusion in the underlying index. Existing index components must have a float-adjusted market capitalization of US\$300 million to remain in the underlying index at each rebalancing.

Liquidity: The liquidity measurement used is a liquidity ratio, defined as dollar value traded over the previous 12-months divided by the float-adjusted market capitalization as of the underlying index rebalancing reference date. Stocks having a float-adjusted market capitalization above US\$500 million must have a liquidity ratio greater than 90% to be eligible for addition to the underlying index. Stocks having a float-adjusted market capitalization between US\$400 and US\$500 million must have a liquidity ratio greater than 150% to be eligible for addition to the underlying index. Existing index constituents must have a liquidity ratio greater than 50% to remain in the underlying index at the quarterly rebalancing. The length of time to evaluate liquidity is reduced to the available trading period for IPOs or spin-offs that do not have 12 months of trading history.

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**Takeover Restrictions:** At the discretion of S&P, constituents with shareholder ownership restrictions defined in company bylaws may be deemed ineligible for inclusion in the underlying index. Ownership restrictions preventing entities from replicating the index weight of a company may be excluded from the eligible universe or removed from the underlying index.

**Turnover:** S&P believes turnover in index membership should be avoided when possible. At times, a company may appear to temporarily violate one or more of the addition criteria. However, the addition criteria are for addition to the underlying index, not for continued membership. As a result, an index constituent that appears to violate the criteria for addition to the underlying index will not be deleted unless ongoing conditions warrant a change in the composition of the underlying index.

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Nikkei 225 Index (“NKY”)

The NKY

The NKY was developed by Nikkei Inc. and is calculated, maintained and published by Nikkei Digital Media, Inc. a wholly owned subsidiary of Nikkei Inc. The Nikkei 225 is reported by Bloomberg L.P. under the symbol “NKY.” The NKY is a stock index that measures the composite price performance of selected Japanese stocks. The formal name of the NKY is the Nikkei Stock Average. The NKY is based on 225 underlying stocks (the “Nikkei Underlying Stocks”) trading on the Tokyo Stock Exchange (“TSE”) representing a broad cross-section of Japanese industries. All 225 Nikkei Underlying Stocks are stocks listed in the First Section of the TSE. Stocks listed in the First Section of the TSE are among the most actively traded stocks on the TSE. Nikkei Inc. rules require that the 75 most liquid issues (one-third of the component count of the NKY) be included in the NKY. Nikkei Inc. was first calculated and published the NKY in 1970; prior to 1970, the TSE calculated the NKY.

The 225 companies included in the NKY are divided into six sector categories: Technology, Financials, Consumer Goods, Materials, Capital Goods/Others and Transportation and Utilities. These six sector categories are further divided into 36 industrial classifications as follows:

- Technology — Pharmaceuticals, Electrical Machinery, Automobiles, Precision Machinery, Telecommunications;
  - Financials — Banks, Miscellaneous Finance, Securities, Insurance;
  - Consumer Goods — Marine Products, Food, Retail, Services;
  - Materials — Mining, Textiles, Paper and Pulp, Chemicals, Oil, Rubber, Ceramics, Steel, Nonferrous Metals, Trading House;
  - Capital Goods/Others — Constructions, Machinery, Shipbuilding, Transportation Equipment, Miscellaneous Manufacturing, Real Estate; and
  - Transportation and Utilities — Railroads and Buses, Trucking, Shipping, Airlines, Warehousing, Electric Power, Gas.
- Calculation of the NKY

The NKY is a modified, price-weighted index (i.e., a Nikkei Underlying Stock’s weight in the NKY is based on its price per share rather than the total market capitalization of the issuer) which is calculated by (i) multiplying the per share price of each Nikkei Underlying Stock by the corresponding weighting factor for such Nikkei Underlying Stock (a “Weight Factor”), (ii) calculating the sum of all these products and (iii) dividing such sum by a divisor (the “Divisor”). The Divisor was initially set at 225 for the date of May 16, 1949 (the date on which the TSE was reopened after World War II) using historical numbers from that date. The Divisor is subject to periodic adjustments as set forth below. Each Weight Factor is computed by dividing ¥50 by the presumed par value of the relevant Nikkei Underlying Stock, so that the share price of each Nikkei Underlying Stock when multiplied by its Weight Factor corresponds to a share price based on a uniform par value of ¥50. The stock prices used in the calculation of the NKY are those reported by a primary market for the Nikkei Underlying Stocks (currently the TSE). The level of the NKY is calculated once every 15 seconds during TSE trading hours.

In order to maintain continuity in the NKY in the event of certain changes due to non-market factors affecting the Nikkei Underlying Stocks, such as the addition or deletion of stocks, substitution of stocks, stock splits or distributions of assets to stockholders, the Divisor used in calculating the NKY is adjusted in a manner designed to prevent any instantaneous change or discontinuity in the level of the NKY. Thereafter, the Divisor remains at the new value until a further adjustment is necessary as the result of another change. As a result of such change affecting any Nikkei Underlying Stock, the Divisor is adjusted in such a way that the sum of all share prices immediately after such change multiplied by the applicable Weight Factor and divided by the new Divisor (i.e., the level of the NKY immediately after such change) will equal the level of the NKY immediately prior to the change.

Standards for Listing and Maintenance

A Nikkei Underlying Stock may be deleted or added by Nikkei Inc. Any stock becoming ineligible for listing in the First Section of the TSE due to any of the following reasons will be deleted from the Nikkei Underlying Stocks: (i) bankruptcy of the issuer, (ii) merger of the issuer with, or acquisition of the issuer by, another company, (iii) delisting of such stock, (iv) transfer of such stock to the “Seiri-Post” because of excess debt of the issuer or because of any other reason or (v) transfer of such stock to the Second Section. In addition, a component stock transferred to the “Kanri-Post” (Posts for stocks under supervision) becomes a candidate for deletion. Nikkei Underlying Stocks with relatively low liquidity, based on trading value and rate of price fluctuation over the past five years, may be deleted by Nikkei Inc. Upon deletion of a stock from the Nikkei Underlying Stocks, Nikkei Inc. will select a replacement for such deleted Nikkei Underlying Stock in accordance with certain criteria. In an exceptional case, a newly listed stock in the First Section of the TSE that is recognized by Nikkei Inc. to be representative of a market may be added to the Nikkei Underlying Stocks. In such a case, a newly listed stock in the First Section of the TSE that is recognized by Nikkei Inc. to be representative of a market may be added to the Nikkei Underlying Stocks. In such a case, an existing Nikkei Underlying Stock with low trading volume and deemed not to be representative of a market will be deleted by Nikkei Inc.

A list of the issuers of the Nikkei Underlying Stocks constituting the NKY is available from the Nikkei Economic Electronic Databank System and from the Stock Market Indices Data Book published by Nikkei Inc. Nikkei Inc. may delete, add or substitute any stock

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underlying the NKY.

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“Nikkei®” is a trademark of Nikkei. The Notes are not sponsored, endorsed, sold or promoted by Nikkei, and Nikkei makes no representation regarding the advisability of investing in the Notes.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

EURO STOXX 50<sup>®</sup> Index (“SX5E”)

The SX5E was created by STOXX Limited (“STOXX”), a subsidiary of Deutsche Börse AG. Publication of the SX5E began in February 1998, based on an initial index level of 1,000 at December 31, 1991.

Composition and Maintenance

The SX5E is composed of 50 component stocks of market sector leaders from within the 19 EURO STOXX<sup>®</sup> Supersector indices, which represent the Eurozone portion of the STOXX Europe 600<sup>®</sup> Supersector indices. The composition of the SX5E is reviewed annually, based on the closing stock data on the last trading day in August. The component stocks are announced on the first trading day in September. Changes to the component stocks are implemented on the third Friday in September and are effective the following trading day. Changes in the composition of the SX5E are made to ensure that the SX5E includes the 50 market sector leaders from within the SX5E. The free float factors for each component stock used to calculate the SX5E, as described below, are reviewed, calculated, and implemented on a quarterly basis and are fixed until the next quarterly review. The SX5E is also reviewed on an ongoing basis. Corporate actions (including initial public offerings, mergers and takeovers, spin-offs, delistings, and bankruptcy) that affect the SX5E composition are announced immediately, implemented two trading days later, and become effective on the next trading day after implementation.

Calculation of the SX5E

The SX5E is calculated with the “Laspeyres formula,” which measures the aggregate price changes in the component stocks against a fixed base quantity weight. The formula for calculating the SX5E value can be expressed as follows:

$$\text{SX5E} = \frac{\text{Free float market capitalization of the SX5E}}{\text{Divisor}} \times 1,000$$

The “free float market capitalization of the SX5E” is equal to the sum of the products of the closing price, market capitalization, the number of shares, the free float factor and weighing cap factor for each component stock as of the time the SX5E is being calculated.

The SX5E is also subject to a divisor, which is adjusted to maintain the continuity of the SX5E values across changes due to corporate actions, such as the deletion and addition of stocks, the substitution of stocks, stock dividends, and stock splits.

License Agreement

We have entered into a non-exclusive license agreement with STOXX providing for the license to us and certain of our affiliated or subsidiary companies, in exchange for a fee, of the right to use indices owned and published by STOXX (including the SX5E) in connection with certain securities, including the Notes offered hereby.

The license agreement between us and STOXX requires that the following language be stated in this document: STOXX has no relationship to us, other than the licensing of the SX5E and the related trademarks for use in connection with the Notes. STOXX does not:

- sponsor, endorse, sell, or promote the Notes;
- recommend that any person invest in the Notes offered hereby or any other securities;
- have any responsibility or liability for or make any decisions about the timing, amount, or pricing of the Notes;
- have any responsibility or liability for the administration, management, or marketing of the Notes; or
- consider the needs of the Notes or the holders of the Notes in determining, composing, or calculating the SX5E, or have any obligation to do so.

STOXX will not have any liability in connection with the Notes. Specifically:

- STOXX does not make any warranty, express or implied, and disclaims any and all warranty concerning: the results to be obtained by the Notes, the holders of the Notes or any other person in connection with the use of the SX5E and the data included in the SX5E;
- the accuracy or completeness of the SX5E and its data;

- the merchantability and the fitness for a particular purpose or use of the SX5E and its data;
- STOXX will have no liability for any errors, omissions, or interruptions in the SX5E or its data; and
- Under no circumstances will STOXX be liable for any lost profits or indirect, punitive, special, or consequential damages or losses, even if STOXX knows that they might occur.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

The licensing agreement between us and STOXX is solely for their benefit and our benefit, and not for the benefit of the holders of the Notes or any other third parties.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

**HISTORICAL INFORMATION**

The graphs below set forth the information relating to the historical performance of the Reference Assets. In addition, below the graphs are tables setting forth the intra-day high, intra-day low and period-end closing prices or levels, as applicable, of the Reference Assets. The information provided in these tables is for the period from January 1, 2008 through October 26, 2018.

We obtained the information regarding the historical performance of the Reference Assets in the graphs and tables below from Bloomberg Financial Markets.

We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets. The historical performance of any Reference Asset should not be taken as an indication of its future performance, and no assurance can be given as to the prices or levels of the Reference Assets at any time. We cannot give you assurance that the performance of the Reference Assets will not result in the loss of all or part of your investment.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

Historical Information for the SPDR® S&P® Oil & Gas Exploration & Production ETF (“XOP”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing prices of this Reference Asset. The information provided in the table is for the period from January 1, 2008 through October 26, 2018.

| Period-Start Date | Period-End Date | High Intra-Day Share Price of this Reference Asset (\$) | Low Intra-Day Share Price of this Reference Asset (\$) | Period-End Closing Share Price of this Reference Asset (\$) |
|-------------------|-----------------|---------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|
| 1/1/2008          | 3/31/2008       | 55.97                                                   | 42.35                                                  | 53.73                                                       |
| 4/1/2008          | 6/30/2008       | 71.61                                                   | 53.24                                                  | 70.15                                                       |
| 7/1/2008          | 9/30/2008       | 73.04                                                   | 40.88                                                  | 44.83                                                       |
| 10/1/2008         | 12/31/2008      | 44.27                                                   | 22.89                                                  | 29.20                                                       |
| 1/1/2009          | 3/31/2009       | 34.62                                                   | 23.02                                                  | 26.60                                                       |
| 4/1/2009          | 6/30/2009       | 38.88                                                   | 26.22                                                  | 31.72                                                       |
| 7/1/2009          | 9/30/2009       | 40.22                                                   | 27.91                                                  | 38.62                                                       |
| 10/1/2009         | 12/31/2009      | 44.17                                                   | 36.18                                                  | 41.82                                                       |
| 1/1/2010          | 3/31/2010       | 44.62                                                   | 38.16                                                  | 42.13                                                       |
| 4/1/2010          | 6/30/2010       | 45.94                                                   | 37.02                                                  | 38.99                                                       |
| 7/1/2010          | 9/30/2010       | 42.96                                                   | 37.44                                                  | 42.26                                                       |
| 10/1/2010         | 12/31/2010      | 53.07                                                   | 41.94                                                  | 52.62                                                       |
| 1/1/2011          | 3/31/2011       | 65.04                                                   | 52.25                                                  | 64.50                                                       |
| 4/1/2011          | 6/30/2011       | 65.76                                                   | 53.97                                                  | 58.78                                                       |
| 7/1/2011          | 9/30/2011       | 65.58                                                   | 42.80                                                  | 42.80                                                       |
| 10/1/2011         | 12/31/2011      | 57.67                                                   | 37.68                                                  | 52.69                                                       |
| 1/1/2012          | 3/31/2012       | 61.81                                                   | 52.25                                                  | 56.91                                                       |
| 4/1/2012          | 6/30/2012       | 58.29                                                   | 44.24                                                  | 50.40                                                       |
| 7/1/2012          | 9/30/2012       | 59.79                                                   | 47.94                                                  | 55.69                                                       |
| 10/1/2012         | 12/31/2012      | 57.47                                                   | 50.05                                                  | 54.07                                                       |
| 1/1/2013          | 3/31/2013       | 62.66                                                   | 54.38                                                  | 60.49                                                       |
| 4/1/2013          | 6/30/2013       | 63.30                                                   | 54.05                                                  | 58.18                                                       |
| 7/1/2013          | 9/30/2013       | 66.80                                                   | 58.29                                                  | 65.89                                                       |
| 10/1/2013         | 12/31/2013      | 73.74                                                   | 64.27                                                  | 68.53                                                       |
| 1/1/2014          | 3/31/2014       | 72.35                                                   | 63.68                                                  | 71.83                                                       |
| 4/1/2014          | 6/30/2014       | 84.04                                                   | 70.72                                                  | 82.28                                                       |
| 7/1/2014          | 9/30/2014       | 82.67                                                   | 68.26                                                  | 68.83                                                       |
| 10/1/2014         | 12/31/2014      | 69.68                                                   | 42.04                                                  | 47.86                                                       |
| 1/1/2015          | 3/31/2015       | 54.20                                                   | 41.63                                                  | 51.66                                                       |
| 4/1/2015          | 6/30/2015       | 56.18                                                   | 46.21                                                  | 46.66                                                       |
| 7/1/2015          | 9/30/2015       | 46.80                                                   | 31.65                                                  | 32.84                                                       |
| 10/1/2015         | 12/31/2015      | 40.82                                                   | 28.31                                                  | 30.22                                                       |
| 1/1/2016          | 3/31/2016       | 31.68                                                   | 22.07                                                  | 30.35                                                       |
| 4/1/2016          | 6/30/2016       | 38.27                                                   | 29.02                                                  | 34.81                                                       |
| 7/1/2016          | 9/30/2016       | 39.26                                                   | 32.22                                                  | 38.46                                                       |
| 10/1/2016         | 12/31/2016      | 44.97                                                   | 34.14                                                  | 41.42                                                       |
| 1/1/2017          | 3/31/2017       | 42.67                                                   | 34.56                                                  | 37.44                                                       |
| 4/1/2017          | 6/30/2017       | 38.64                                                   | 29.90                                                  | 31.92                                                       |
| 7/1/2017          | 9/30/2017       | 34.69                                                   | 28.97                                                  | 34.09                                                       |



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|-----------|------------|-------|-------|-------|
| 10/1/2017 | 12/29/2017 | 37.82 | 31.67 | 37.18 |
| 1/1/2018  | 3/31/2018  | 40.19 | 30.99 | 35.22 |
| 4/1/2018  | 6/30/2018  | 44.74 | 33.36 | 43.06 |
| 7/1/2018  | 9/30/2018  | 45.45 | 38.78 | 43.29 |
| 10/1/2018 | 10/26/2018 | 44.81 | 35.07 | 35.92 |

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

The graph below illustrates the performance of this Reference Asset from January 1, 2008 to October 26, 2018, based on its Initial Level of \$35.92. The red line represents the Coupon Barrier and Trigger Level of \$25.14, which is equal to 70.00% of its Initial Level, rounded to two decimal places.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

Historical Information for Nikkei 225 Index (“NKY”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing levels of this Reference Asset. The information provided in the table is for the period from January 1, 2008 through October 26, 2018.

| Period-Start Date | Period-End Date | High Intra-Day Level of this Reference Asset | Low Intra-Day Level of this Reference Asset | Period-End Closing Level of this Reference Asset |
|-------------------|-----------------|----------------------------------------------|---------------------------------------------|--------------------------------------------------|
| 1/1/2008          | 3/31/2008       | 15,156.66                                    | 11,691.00                                   | 12,525.54                                        |
| 4/1/2008          | 6/30/2008       | 14,601.27                                    | 12,521.84                                   | 13,481.38                                        |
| 7/1/2008          | 9/30/2008       | 13,603.31                                    | 11,160.83                                   | 11,259.86                                        |
| 10/1/2008         | 12/31/2008      | 11,456.64                                    | 6,994.90                                    | 8,859.56                                         |
| 1/1/2009          | 3/31/2009       | 9,325.35                                     | 7,021.28                                    | 8,109.53                                         |
| 4/1/2009          | 6/30/2009       | 10,170.82                                    | 8,084.62                                    | 9,958.44                                         |
| 7/1/2009          | 9/30/2009       | 10,767.00                                    | 9,050.33                                    | 10,133.23                                        |
| 10/1/2009         | 12/31/2009      | 10,683.12                                    | 9,076.41                                    | 10,638.06                                        |
| 1/1/2010          | 3/31/2010       | 11,147.62                                    | 9,867.39                                    | 11,089.94                                        |
| 4/1/2010          | 6/30/2010       | 11,408.17                                    | 9,347.07                                    | 9,382.64                                         |
| 7/1/2010          | 9/30/2010       | 9,807.36                                     | 8,796.45                                    | 9,369.35                                         |
| 10/1/2010         | 12/31/2010      | 10,394.22                                    | 9,123.62                                    | 10,228.92                                        |
| 1/1/2011          | 3/31/2011       | 10,891.60                                    | 8,227.63                                    | 9,755.10                                         |
| 4/1/2011          | 6/30/2011       | 10,017.47                                    | 9,318.62                                    | 9,816.09                                         |
| 7/1/2011          | 9/30/2011       | 10,207.91                                    | 8,359.70                                    | 8,700.29                                         |
| 10/1/2011         | 12/31/2011      | 9,152.39                                     | 8,135.79                                    | 8,455.35                                         |
| 1/1/2012          | 3/31/2012       | 10,255.15                                    | 8,349.33                                    | 10,083.56                                        |
| 4/1/2012          | 6/30/2012       | 10,190.35                                    | 8,238.96                                    | 9,006.78                                         |
| 7/1/2012          | 9/30/2012       | 9,288.53                                     | 8,328.02                                    | 8,870.16                                         |
| 10/1/2012         | 12/31/2012      | 10,433.63                                    | 8,488.14                                    | 10,395.18                                        |
| 1/1/2013          | 3/31/2013       | 12,650.26                                    | 10,398.61                                   | 12,335.96                                        |
| 4/1/2013          | 6/30/2013       | 15,942.60                                    | 11,805.78                                   | 13,677.32                                        |
| 7/1/2013          | 9/30/2013       | 14,953.29                                    | 13,188.14                                   | 14,455.80                                        |
| 10/1/2013         | 12/31/2013      | 16,320.22                                    | 13,748.94                                   | 16,291.31                                        |
| 1/1/2014          | 3/31/2014       | 16,164.01                                    | 13,995.86                                   | 14,827.83                                        |
| 4/1/2014          | 6/30/2014       | 15,442.67                                    | 13,885.11                                   | 15,162.10                                        |
| 7/1/2014          | 9/30/2014       | 16,374.14                                    | 14,753.84                                   | 16,173.52                                        |
| 10/1/2014         | 12/31/2014      | 18,030.83                                    | 14,529.03                                   | 17,450.77                                        |
| 1/1/2015          | 3/31/2015       | 19,778.60                                    | 16,592.57                                   | 19,206.99                                        |
| 4/1/2015          | 6/30/2015       | 20,952.71                                    | 18,927.95                                   | 20,235.73                                        |
| 7/1/2015          | 9/30/2015       | 20,946.93                                    | 16,901.49                                   | 17,388.15                                        |
| 10/1/2015         | 12/31/2015      | 20,012.40                                    | 17,389.57                                   | 19,033.71                                        |
| 1/1/2016          | 3/31/2016       | 18,951.12                                    | 14,865.77                                   | 16,758.67                                        |
| 4/1/2016          | 6/30/2016       | 17,613.56                                    | 14,864.01                                   | 15,575.92                                        |
| 7/1/2016          | 9/30/2016       | 17,156.36                                    | 15,106.52                                   | 16,449.84                                        |
| 10/1/2016         | 12/31/2016      | 19,592.90                                    | 16,111.81                                   | 19,114.37                                        |
| 1/1/2017          | 3/31/2017       | 19,668.01                                    | 18,650.33                                   | 18,909.26                                        |
| 4/1/2017          | 6/30/2017       | 20,318.11                                    | 18,224.68                                   | 20,033.43                                        |
| 7/1/2017          | 9/29/2017       | 20,481.27                                    | 19,239.52                                   | 20,356.28                                        |

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|-----------|------------|-----------|-----------|-----------|
| 10/1/2017 | 12/31/2017 | 23,382.15 | 20,363.28 | 22,764.94 |
| 1/1/2018  | 3/31/2018  | 24,129.34 | 20,347.49 | 21,159.08 |
| 4/1/2018  | 6/30/2018  | 23,050.39 | 21,056.02 | 22,304.51 |
| 7/1/2018  | 9/30/2018  | 24,286.10 | 21,462.95 | 24,120.04 |
| 10/1/2018 | 10/26/2018 | 24,448.07 | 20,971.93 | 21,184.60 |

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

The graph below illustrates the performance of this Reference Asset from January 1, 2008 to October 26, 2018, based on its Initial Level of 21,184.60. The red line represents the Coupon Barrier and Trigger Level of 14,829.22, which is equal to 70.00% of its Initial Level.

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Contingent Coupon Barrier Notes Linked to the Lesser Performing of  
One Exchange Traded Fund and Two Equity Indices  
Royal Bank of Canada

Historical Information for the EURO STOXX 50® Index (“SX5E”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing levels of this Reference Asset. The information provided in the table is for the period from January 1, 2008 through October 26, 2018.

| Period-Start Date | Period-End Date | High Intra-Day Level of this Reference Asset | Low Intra-Day Level of this Reference Asset | Period-End Closing Level of this Reference Asset |
|-------------------|-----------------|----------------------------------------------|---------------------------------------------|--------------------------------------------------|
| 1/1/2008          | 3/31/2008       | 4,411.59                                     | 3,417.25                                    | 3,628.06                                         |
| 4/1/2008          | 6/30/2008       | 3,900.30                                     | 3,298.05                                    | 3,352.81                                         |
| 7/1/2008          | 9/30/2008       | 3,456.81                                     | 2,924.13                                    | 3,038.20                                         |
| 10/1/2008         | 12/31/2008      | 3,130.25                                     | 2,128.29                                    | 2,451.48                                         |
| 1/1/2009          | 3/31/2009       | 2,608.15                                     | 1,765.49                                    | 2,071.13                                         |
| 4/1/2009          | 6/30/2009       | 2,549.32                                     | 2,021.53                                    | 2,401.69                                         |
| 7/1/2009          | 9/30/2009       | 2,915.71                                     | 2,258.60                                    | 2,872.63                                         |
| 10/1/2009         | 12/31/2009      | 3,001.56                                     | 2,693.80                                    | 2,992.08                                         |
| 1/1/2010          | 3/31/2010       | 3,044.37                                     | 2,617.77                                    | 2,931.16                                         |
| 4/1/2010          | 6/30/2010       | 3,027.14                                     | 2,448.10                                    | 2,573.32                                         |
| 7/1/2010          | 9/30/2010       | 2,849.45                                     | 2,502.50                                    | 2,747.90                                         |
| 10/1/2010         | 12/31/2010      | 2,902.80                                     | 2,635.08                                    | 2,807.04                                         |
| 1/1/2011          | 3/31/2011       | 3,077.24                                     | 2,717.74                                    | 2,910.91                                         |
| 4/1/2011          | 6/30/2011       | 3,029.68                                     | 2,692.95                                    | 2,848.53                                         |
| 7/1/2011          | 9/30/2011       | 2,887.30                                     | 1,935.89                                    | 2,179.66                                         |
| 10/1/2011         | 12/31/2011      | 2,506.22                                     | 2,054.98                                    | 2,316.55                                         |
| 1/1/2012          | 3/31/2012       | 2,611.42                                     | 2,279.73                                    | 2,477.28                                         |
| 4/1/2012          | 6/30/2012       | 2,509.93                                     | 2,050.16                                    | 2,264.72                                         |
| 7/1/2012          | 9/30/2012       | 2,604.77                                     | 2,142.46                                    | 2,454.26                                         |
| 10/1/2012         | 12/31/2012      | 2,668.23                                     | 2,427.32                                    | 2,635.93                                         |
| 1/1/2013          | 3/31/2013       | 2,754.80                                     | 2,563.64                                    | 2,624.02                                         |
| 4/1/2013          | 6/30/2013       | 2,851.48                                     | 2,494.54                                    | 2,602.59                                         |
| 7/1/2013          | 9/30/2013       | 2,955.47                                     | 2,539.15                                    | 2,893.15                                         |
| 10/1/2013         | 12/31/2013      | 3,116.23                                     | 2,891.39                                    | 3,109.00                                         |
| 1/1/2014          | 3/31/2014       | 3,185.68                                     | 2,944.13                                    | 3,161.60                                         |
| 4/1/2014          | 6/30/2014       | 3,325.50                                     | 3,083.43                                    | 3,228.24                                         |
| 7/1/2014          | 9/30/2014       | 3,301.15                                     | 2,977.52                                    | 3,225.93                                         |
| 10/1/2014         | 12/31/2014      | 3,278.97                                     | 2,789.63                                    | 3,146.43                                         |
| 1/1/2015          | 3/31/2015       | 3,742.42                                     | 2,998.53                                    | 3,697.38                                         |
| 4/1/2015          | 6/30/2015       | 3,836.28                                     | 3,374.18                                    | 3,424.30                                         |
| 7/1/2015          | 9/30/2015       | 3,714.26                                     | 2,973.16                                    | 3,100.67                                         |
| 10/1/2015         | 12/31/2015      | 3,524.04                                     | 3,036.17                                    | 3,267.52                                         |
| 1/1/2016          | 3/31/2016       | 3,266.01                                     | 2,672.73                                    | 3,004.93                                         |
| 4/1/2016          | 6/30/2016       | 3,156.86                                     | 2,678.27                                    | 2,864.74                                         |
| 7/1/2016          | 9/30/2016       | 3,101.75                                     | 2,742.66                                    | 3,002.24                                         |
| 10/1/2016         | 12/31/2016      | 3,290.52                                     | 2,937.98                                    | 3,290.52                                         |
| 1/1/2017          | 3/31/2017       | 3,500.93                                     | 3,214.31                                    | 3,500.93                                         |
| 4/1/2017          | 6/30/2017       | 3,666.80                                     | 3,407.33                                    | 3,441.88                                         |
| 7/1/2017          | 9/30/2017       | 3,594.85                                     | 3,363.68                                    | 3,594.85                                         |

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|           |            |          |          |          |
|-----------|------------|----------|----------|----------|
| 10/1/2017 | 12/29/2017 | 3,708.82 | 3,503.20 | 3,503.96 |
| 1/1/2018  | 3/31/2018  | 3,687.22 | 3,261.86 | 3,361.50 |
| 4/1/2018  | 6/30/2018  | 3,596.20 | 3,300.50 | 3,395.60 |
| 7/1/2018  | 9/30/2018  | 3,536.87 | 3,274.40 | 3,399.20 |
| 10/1/2018 | 10/26/2018 | 3,425.45 | 3,090.85 | 3,134.89 |

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

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The graph below illustrates the performance of this Reference Asset from January 1, 2008 to October 26, 2018, based on its Initial Level of 3,134.89. The red line represents the Coupon Barrier and Trigger Level of 2,194.42, which is equal to 70.00% of its Initial Level, rounded to two decimal places.

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USE OF PROCEEDS AND HEDGING

In anticipation of the sale of the Notes, we expect to enter into hedging transactions with one or more of our affiliates, involving purchases of the securities represented by the Reference Assets, shares of the XOP and/or listed and/or over-the-counter derivative instruments related to any of those securities or the Reference Assets prior to or on the Trade Date. From time to time, including around the time of each Observation Date, the Valuation Dates and the Maturity Date, we, RBCCM, and our other affiliates may enter into additional hedging transactions or unwind those that we or they have entered into. In this regard, we, RBCCM, and our other affiliates may:

- acquire or dispose of investments relating to the Reference Assets;
- acquire or dispose of long or short positions in listed or over-the-counter derivative instruments based on the Reference Assets; or
- any combination of the above two.

We, RBCCM and our other affiliates may acquire a long or short position in securities similar to the Notes from time to time and may, in our or their sole discretion, hold or resell those similar securities.

We, RBCCM and our other affiliates may close out our or their hedges on or before any Observation Date. That step may involve sales or purchases of the securities represented by the Reference Assets, shares of the XOP, or over-the-counter derivative instruments linked to the Reference Assets.

SUPPLEMENTAL DISCUSSION OF  
U.S. FEDERAL INCOME TAX CONSEQUENCES

The following disclosure supplements, and to the extent inconsistent supersedes, the discussion in the product prospectus supplement dated September 10, 2018 under “Supplemental Discussion of U.S. Federal Income Tax Consequences.”

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2021. Based on our determination that the Notes are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Notes. However, it is possible that the Notes could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Assets or the Notes (for example, upon the NKY or the SX5E rebalancing), and following such occurrence the Notes could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Assets or the Notes should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Notes and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

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**SUPPLEMENTAL PLAN OF DISTRIBUTION (CONFLICTS OF INTEREST)**

JPMorgan Chase Bank, N.A., J.P. Morgan Securities LLC and its affiliates will act as placement agents for the Notes and will receive a fee from the Issuer of \$15.00 per \$1,000 in principal amount of the Notes.

In addition, RBCCM or another of its affiliates or agents may use this document in market-making transactions after the initial sale of the Notes, but is under no obligation to do so and may discontinue any market-making activities at any time without notice.

Delivery of the Notes will be made against payment for the Notes on October 31, 2018, which is the third (3rd) business day following the Trade Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated September 7, 2018. For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated September 7, 2018.

We expect to deliver the Notes on a date that is greater than two business days following the Trade Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes more than two business days prior to the original Issue Date will be required to specify alternative arrangements to prevent a failed settlement.

The value of the Notes shown on your account statement may be based on RBCCM’s estimate of the value of the Notes if RBCCM or another of our affiliates were to make a market in the Notes (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Notes in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately six months after the issue date of the Notes, the value of the Notes that may be shown on your account statement may be higher than RBCCM’s estimated value of the Notes at that time. This is because the estimated value of the Notes will not include the underwriting discount and our hedging costs and profits; however, the value of the Notes shown on your account statement during that period may initially be a higher amount, reflecting the addition of RBCCM’s underwriting discount and our estimated costs and profits from hedging the Notes. This excess is expected to decrease over time until the end of this period. After this period, if RBCCM repurchases your Notes, it expects to do so at prices that reflect their estimated value.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.

**STRUCTURING THE NOTES**

The Notes are our debt securities, the return on which is linked to the performance of the Reference Assets. As is the case for all of our debt securities, including our structured notes, the economic terms of the Notes reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Notes at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate, is a factor that reduced the initial estimated value of the Notes at the time their terms were set. Unlike the estimated value included in this pricing supplement, any value of the Notes determined for purposes of a secondary market transaction may be based on a different funding rate, which may result in a lower value for the Notes than if our initial internal funding rate were used.

In order to satisfy our payment obligations under the Notes, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our

creditworthiness, interest rate movements, the volatility of the Reference Assets, and the tenor of the Notes. The economic terms of the Notes and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduced the economic terms of the Notes to you. The initial offering price of the Notes also reflects the underwriting commission and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Selected Risk Considerations—The Initial Estimated Value of the Notes Is Less than the Price to the Public” above.

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VALIDITY OF THE NOTES

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Notes has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Notes have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Notes will be validly issued and, to the extent validity of the Notes is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, and will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Notes or the Indenture which may be limited by applicable law; to insolvency and other laws of general application affecting creditors' rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated September 7, 2018, which has been filed as Exhibit 5.1 to Royal Bank's Form 6-K filed with the SEC dated September 7, 2018. In the opinion of Morrison & Foerster LLP, when the Notes have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Notes will be valid, binding and enforceable obligations of Royal Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency and similar laws affecting creditors' rights generally, concepts of reasonableness and equitable principles of general applicability (including, without limitation, concepts of good faith, fair dealing and the lack of bad faith). This opinion is given as of the date hereof and is limited to the laws of the State of New York. This opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated September 7, 2018, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated September 7, 2018.

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