

ROYAL BANK OF CANADA
 Form FWP
 July 17, 2017

ISSUER FREE WRITING PROSPECTUS

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Dated July 17, 2017

Royal Bank of Canada Trigger Autocallable Contingent Yield Notes

\$ Notes Linked to the SPDR S&P[®] Oil & Gas Exploration & Production ETF due on or about July 26, 2019

Investment Description

Trigger Autocallable Contingent Yield Notes (the “Notes”) are unsecured and unsubordinated debt securities issued by Royal Bank of Canada linked to the performance of the SPDR S&P[®] Oil & Gas Exploration & Production ETF (the “Underlying”). We will pay a quarterly Contingent Coupon payment if the closing price of the Underlying on the applicable Coupon Observation Date is equal to or greater than the Coupon Barrier. Otherwise, no coupon will be paid for that quarter. We will automatically call the Notes early if the closing price of the Underlying on any Call Observation Date (beginning after six months) is equal to or greater than the Initial Price. If the Notes are called, we will pay you the principal amount of your Notes plus the Contingent Coupon for that quarter and no further amounts will be owed to you under the Notes. If the Notes are not called prior to maturity and the Final Price of the Underlying is equal to or greater than the Downside Threshold (which is the same price as the Coupon Barrier), we will pay you a cash payment at maturity equal to the principal amount of your Notes plus the Contingent Coupon for the final quarter. If the Final Price of the Underlying is less than the Downside Threshold, we will pay you less than the full principal amount, if anything, resulting in a loss on your initial investment that is proportionate to the negative performance of the Underlying over the term of the Notes, and you may lose up to 100% of your initial investment. Investing in the Notes involves significant risks. You may lose some or all of your principal amount. The contingent repayment of principal only applies if you hold the Notes until maturity. Generally, the higher the Contingent Coupon Rate on the Notes, the greater the risk of loss on the Notes. Any payment on the Notes, including any repayment of principal, is subject to our creditworthiness. If we were to default on our payment obligations, you may not receive any amounts owed to you under the Notes and you could lose your entire investment. The Notes will not be listed on any securities exchange.

Features Key Dates¹

Contingent Coupon — We will pay a quarterly Contingent Coupon payment if the closing price of the Underlying on the applicable Coupon Observation Date is equal to or greater than the Coupon Barrier. Otherwise, no coupon will be paid for the quarter.

Automatically Callable — We will automatically call the Notes and pay you the principal amount of your Notes plus the Contingent Coupon otherwise due for that quarter if the closing price of the Underlying on any quarterly Call Observation Date (beginning after six months) is greater than or equal to the Initial Price. If the Notes are not called, investors will have the potential for downside equity market risk at maturity.

Contingent Repayment of Principal at Maturity— If by maturity the Notes have not been called and the price of the Underlying does not close below the Downside Threshold on the Final Valuation Date, we will repay your principal amount per Note at maturity. If the price of the Underlying closes below the Downside Threshold on the Final Valuation Date, we will pay less than the principal amount, if anything, resulting in a loss on your initial investment that is proportionate to the decline in the price of the Underlying from the Trade Date to the Final Valuation Date.

The contingent repayment of principal only applies if you hold the Notes until maturity. Any payment on the Notes, including any repayment of principal, is subject to our creditworthiness.

Trade Date¹ July 21, 2017

Settlement Date¹ July 26, 2017

Coupon Observation Dates² Quarterly (see page 6)

Call Observation Dates² Quarterly (callable after 6 months) (see page 6)

Final Valuation Date² July 22, 2019

Maturity Date² July 26, 2019

Expected. In the event that we make any change to the expected Trade Date and settlement date, the Coupon
¹ Observation Dates, the Call Observation Dates, the Final Valuation Date and/or the maturity date will be changed so
 that the stated term of the Notes remains approximately the same.

² Subject to postponement if a market disruption event occurs and as described under “General Terms of the Securities —
 Payment at Maturity” in the accompanying product prospectus supplement no. UBS-TPAOS-2.

NOTICE TO INVESTORS: THE NOTES ARE SIGNIFICANTLY RISKIER THAN CONVENTIONAL DEBT INSTRUMENTS. WE ARE NOT NECESSARILY OBLIGATED TO REPAY THE FULL PRINCIPAL AMOUNT OF THE NOTES AT MATURITY, AND THE NOTES CAN HAVE DOWNSIDE MARKET RISK SIMILAR TO THE UNDERLYING. THIS MARKET RISK IS IN ADDITION TO THE CREDIT RISK INHERENT IN PURCHASING OUR DEBT OBLIGATION. YOU SHOULD NOT PURCHASE THE NOTES IF YOU DO NOT UNDERSTAND OR ARE NOT COMFORTABLE WITH THE SIGNIFICANT RISKS INVOLVED IN INVESTING IN THE NOTES.

YOU SHOULD CAREFULLY CONSIDER THE RISKS DESCRIBED UNDER “KEY RISKS” BEGINNING ON PAGE 7 OF THIS FREE WRITING PROSPECTUS, UNDER “RISK FACTORS” BEGINNING ON PAGE PS-5 OF THE PRODUCT PROSPECTUS SUPPLEMENT NO. UBS-TPAOS-2 AND UNDER “RISK FACTORS” BEGINNING ON PAGE S-1 OF THE PROSPECTUS SUPPLEMENT BEFORE PURCHASING ANY NOTES. EVENTS RELATING TO ANY OF THOSE RISKS, OR OTHER RISKS AND UNCERTAINTIES, COULD ADVERSELY AFFECT THE MARKET VALUE OF, AND THE RETURN ON, YOUR NOTES. YOU MAY LOSE SOME OR ALL OF YOUR INITIAL INVESTMENT IN THE NOTES.

Note Offering

We are offering Trigger Autocallable Contingent Yield Notes linked to the shares of the SPDR S&P[®] Oil & Gas Exploration & Production ETF. The Contingent Coupon Rate, Initial Price, Coupon Barrier and Downside Threshold for the Notes will be determined on the Trade Date. The Notes will be issued in minimum denominations of \$10.00, and integral multiples of \$10.00 in excess thereof, with a minimum investment of \$1,000.00.

Underlying	Contingent Coupon Rate	Initial Price	Downside Threshold	Coupon Barrier	CUSIP	ISIN
SPDR S&P [®] Oil & Gas Exploration & Production ETF (XOP)	8.00% to 8.50% per annum		65.00% of the Initial Price	65.00% of the Initial Price	78013F164	US78013F1646

See “Additional Information About Royal Bank of Canada and the Notes” in this free writing prospectus. The Notes will have the terms specified in the prospectus dated January 8, 2016, the prospectus supplement dated January 8, 2016, product prospectus supplement no. UBS-TPAOS-2 dated January 20, 2016 and this free writing prospectus. Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Notes or passed upon the accuracy or the adequacy of this free writing prospectus or the accompanying prospectus, prospectus supplement and product prospectus supplement no. UBS-TPAOS-2. Any representation to the contrary is a criminal offense.

Offering of the Notes	Price to Public Total Per Note	Fees and Commissions ⁽¹⁾ Total Per Note	Proceeds to Us Total Per Note
Notes linked to the SPDR S&P [®] Oil & Gas Exploration & Production ETF (XOP)	\$10.00	\$0.20	\$9.80

⁽¹⁾ UBS Financial Services Inc., which we refer to as UBS, will receive a commission that will depend on market conditions on the Trade Date. In no event will the commission received by UBS exceed \$0.20 per \$10.00 principal amount of the Notes. See “Supplemental Plan of Distribution (Conflicts of Interest)” on page 17 of this free writing prospectus.

The initial estimated value of the Notes as of the date of this document is \$9.7375 per \$10 in principal amount, which is less than the price to public. The pricing supplement relating to the Notes will set forth our updated estimate of the initial value of the Notes as of the Trade Date, which will not be more than \$0.20 less than this amount. 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 under “Key Risks” beginning on page 7, “Supplemental Plan of Distribution (Conflicts of Interest)” on page 17 and “Structuring the Notes” on page 17 of this free writing prospectus.

The Notes will not constitute deposits insured under the Canada Deposit Insurance Corporation Act or by the United States Federal Deposit Insurance Corporation or any other Canadian or United States government agency or instrumentality.

UBS Financial Services Inc. RBC Capital Markets, LLC

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Additional Information About Royal Bank of Canada and the Notes

Royal Bank of Canada has filed a registration statement (including a prospectus) with the Securities and Exchange Commission, or SEC, for the offering to which this free writing prospectus relates. Before you invest, you should read the prospectus in that registration statement and the other documents relating to this offering that Royal Bank of Canada has filed with the SEC for more complete information about Royal Bank of Canada and this offering. You may obtain these documents without cost by visiting EDGAR on the SEC website at www.sec.gov. Alternatively, Royal Bank of Canada, any agent or any dealer participating in this offering will arrange to send you the prospectus, the prospectus supplement, product prospectus supplement no. UBS-TPAOS-2 and this free writing prospectus if you so request by calling toll-free 866-609-6009.

You may revoke your offer to purchase the Notes at any time prior to the time at which we accept such offer by notifying the applicable agent. We reserve the right to change the terms of, or reject any offer to purchase, the Notes prior to their issuance. In the event of any changes to the terms of the Notes, we will notify you and you will be asked to accept such changes in connection with your purchase. You may also choose to reject such changes, in which case we may reject your offer to purchase.

You should read this free writing prospectus together with the prospectus dated January 8, 2016, as supplemented by the prospectus supplement dated January 8, 2016, relating to our senior global medium-term notes, Series G, of which these Notes are a part, and the more detailed information contained in product prospectus supplement no.

UBS-TPAOS-2 dated January 20, 2016. This free writing prospectus, together with the documents listed below, contains the terms of the Notes and supersedes all other 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, fact sheets, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in "Risk Factors" in the accompanying product prospectus supplement no. UBS-TPAOS-2, as the Notes involve risks not associated with conventional debt securities.

If the terms discussed in this free writing prospectus differ from those discussed in the product prospectus supplement no. UBS-TPAOS-2, the prospectus supplement, or the prospectus, the terms discussed herein will control. Please note in particular that several defined terms in the product prospectus supplement are replaced in this document with different terms:

..instead of "Starting Price" in the product prospectus supplement, the term "Initial Price" is used in this document;

..instead of "Ending Price" in the product prospectus supplement, the term "Final Price" is used in this document;

..instead of "Trigger Price" in the product prospectus supplement, the term "Downside Threshold" is used in this document;

..instead of "Underlying Equity" in the product prospectus supplement, the term "Underlying" is used in this document; and

..instead of "final Observation Date" in the product prospectus supplement, the term "Final Valuation Date" is used in this document.

You may access these on the SEC website at www.sec.gov as follows (or if such address has changed, by reviewing our filing for the relevant date on the SEC website):

..Product prospectus supplement no. UBS-TPAOS-2 dated January 20, 2016:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036116048191/form424b5.htm>

..Prospectus supplement dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008811/p14150424b3.htm>

..Prospectus dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008810/j18160424b3.htm>

As used in this free writing prospectus, "we," "us" or "our" refers to Royal Bank of Canada.

Investor Suitability

The Notes may be suitable for you if, among other considerations:

- .. You fully understand the risks inherent in an investment in the Notes, including the risk of loss of your entire initial investment.
- .. You can tolerate a loss of all or a substantial portion of your investment and are willing to make an investment that may have the same downside market risk as an investment in the Underlying.
- .. You believe the closing price of the Underlying will be equal to or greater than the Coupon Barrier on most or all of the Coupon Observation Dates (including the Final Valuation Date).
- .. You are willing to make an investment whose return is limited to the Contingent Coupon payments, regardless of any potential appreciation of the Underlying, which could be significant.
- .. You can tolerate fluctuations in the price of the Notes prior to maturity that may be similar to or exceed the downside price fluctuations of the Underlying.
- .. You are willing to invest in Notes for which there may be little or no secondary market and you accept that the secondary market will depend in large part on the price, if any, at which RBC Capital Markets, LLC, which we refer to as "RBCCM," is willing to purchase the Notes.
- .. You would be willing to invest in the Notes if the Contingent Coupon Rate were set to the low end of the range specified on the cover page of this free writing prospectus (the actual Contingent Coupon Rate will be determined on the Trade Date).
- .. You understand and accept the risks associated with the Underlying.
- .. You do not seek guaranteed current income from this investment and are willing to forgo dividends paid on the Underlying.
- .. You are willing to invest in securities that may be called early and you are otherwise willing to hold such securities to maturity.
- .. You are willing to assume our credit risk for all payments under the Notes, and understand that if we default on our obligations, you may not receive any amounts due to you, including any repayment of principal.

The Notes may not be suitable for you if, among other considerations:

- .. You do not fully understand the risks inherent in an investment in the Notes, including the risk of loss of your entire initial investment.
- .. You cannot tolerate a loss on your investment and require an investment designed to provide a full return of principal at maturity.
- .. You are not willing to make an investment that may have the same downside market risk as an investment in the Underlying.
- .. You believe that the price of the Underlying will decline during the term of the Notes and is likely to close below the Coupon Barrier on most or all of the Coupon Observation Dates and below the Downside Threshold on the Final Valuation Date.
- .. You seek an investment that participates in the full appreciation in the price of the Underlying or that has unlimited return potential.
- .. You cannot tolerate fluctuations in the price of the Notes prior to maturity that may be similar to or exceed the downside price fluctuations of the Underlying.
- .. You would be unwilling to invest in the Notes if the Contingent Coupon Rate were set to the low end of the range specified on the cover page of this free writing prospectus (the actual Contingent Coupon Rate will be determined on the Trade Date).
- .. You do not understand or accept the risks associated with the Underlying.
- .. You seek guaranteed current income from this investment or prefer to receive the dividends paid on the Underlying.
- .. You are unable or unwilling to hold securities that may be called early, or you are otherwise unable or unwilling to hold such securities to maturity or you seek an investment for which there will be an active secondary market for the Notes.
- .. You are not willing to assume our credit risk for all payments under the Notes, including any repayment of principal.

The suitability considerations identified above are not exhaustive. Whether or not the Notes are a suitable investment

for you will depend on your individual circumstances, and you should reach an investment decision only after you and your investment, legal, tax, accounting, and other advisers have carefully considered the suitability of an investment in the Notes in light of your particular circumstances. You should also review carefully the “Key Risks” beginning on page 7 of this free writing prospectus and “Risk Factors” in the accompanying product prospectus supplement no. UBS-TPAOS-2 for risks related to an investment in the Notes. In addition, you should review carefully the section below, “Information About the Underlying” for more information about the Underlying.

3

Indicative Terms of the Notes¹

Issuer:	Royal Bank of Canada
Principal Amount per Note:	\$10.00 per Note
Term: ²	Approximately two years, if not previously called
Underlying:	The shares of the SPDR S&P [®] Oil & Gas Exploration & Production ETF
Closing Price:	On any trading day, the last reported sale price of the Underlying on the principal national securities exchange in the U.S. on which it is listed for trading, as determined by the calculation agent.
Initial Price:	The closing price of the Underlying on the Trade Date.
Final Price:	The closing price of the Underlying on the Final Valuation Date. If the closing price of the Underlying is equal to or greater than the Coupon Barrier on any Coupon Observation Date, we will pay you the Contingent Coupon applicable to that Coupon Observation Date. If the closing price of the Underlying is
Contingent Coupon:	less than the Coupon Barrier on any Coupon Observation Date, the Contingent Coupon applicable to that Coupon Observation Date will not accrue or be payable and we will not make any payment to you on the relevant Contingent Coupon Payment Date. The Contingent Coupon will be a fixed amount based upon equal quarterly installments at the Contingent Coupon Rate, which will be a per annum rate as set forth below.
Contingent Coupon payments on the Notes are not guaranteed. We will not pay you the Contingent Coupon for any Coupon Observation Date on which the closing price of the Underlying is less than the Coupon Barrier.	
Contingent Coupon Rate:	The Contingent Coupon Rate is expected to be between 8.00% and 8.50% per annum (or 2.00% to 2.125% per quarter). The actual Contingent Coupon Rate will be determined on the Trade Date.
Coupon Barrier:	65.00% of the Initial Price (as may be adjusted in the case of certain adjustment events as described under “General Terms of the Securities — Anti-dilution Adjustments” in the product prospectus supplement). The Coupon Barrier equals the Downside Threshold.
Downside Threshold:	65.00% of the Initial Price (as may be adjusted in the case of certain adjustment events as described under “General Terms of the Securities — Anti-dilution Adjustments” in the product prospectus supplement). The Downside Threshold equals the Coupon Barrier.
Automatic Call Feature:	The Notes will be called automatically if the closing price of the Underlying on any Call Observation Date (beginning after six months and set forth on page 6) is greater than or equal to the Initial Price. If the Notes are called, we will pay you on the

¹ Terms used in this free writing prospectus, but not defined herein, shall have the meanings ascribed to them in the product prospectus supplement.

² In the event we make any change to the expected Trade Date and settlement date, the final Observation Date and maturity date will be changed to ensure that the stated term of the Notes remains approximately the same.
corresponding coupon payment date (which will be the “Call Settlement Date”) a cash payment per Note equal to the principal amount per Note plus the applicable Contingent Coupon payment otherwise due on that day (the “Call Settlement Amount”). No further amounts will be owed to you under the Notes.

Payment at Maturity: If the Notes are not called and the Final Price is equal to or greater than the Downside Threshold and the Coupon Barrier, we will pay you a cash payment per Note on the maturity date equal to \$10.00 plus the Contingent Coupon otherwise due on the maturity date.

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If the Notes are not called and the Final Price is less than the Downside Threshold, we will pay you a cash payment on the maturity date of less than the principal amount, if anything, resulting in a loss on your initial investment that is proportionate to the negative underlying return, equal to:

$\$10.00 + (\$10.00 \times \text{underlying return})$

Underlying Final Price – Initial Price

Return: Initial Price

4

Investment Timeline

Trade Date: The Initial Price of the Underlying is observed, and the Downside Threshold and Coupon Barrier are determined. The Contingent Coupon Rate is set.

Quarterly: If the closing price of the Underlying is equal to or greater than the Coupon Barrier on any Coupon Observation Date, we will pay you a Contingent Coupon payment on the applicable coupon payment date.

The Notes will be called if the closing price of the Underlying on any Call Observation Date (beginning after six months) is equal to or greater than the Initial Price. If the Notes are called, we will pay you a cash payment per Note equal to \$10 plus the Contingent Coupon otherwise due on that date.

The Final Price of the Underlying is observed on the Final Valuation Date.

Maturity Date: If the Notes have not been called and the Final Price is equal to or greater than the Downside Threshold (and the Coupon Barrier), we will repay the principal amount equal to \$10 per Note plus the Contingent Coupon otherwise due on the maturity date.

If the Notes have not been called and the Final Price is less than the Downside Threshold, we will repay less than the principal amount, if anything, resulting in a loss on your initial investment proportionate to the decline of the Underlying, for an amount equal to:

$\$10 + (\$10 \times \text{underlying return})$ per Note

INVESTING IN THE NOTES INVOLVES SIGNIFICANT RISKS. YOU MAY LOSE SOME OR ALL OF YOUR PRINCIPAL AMOUNT. ANY PAYMENT ON THE NOTES, INCLUDING ANY REPAYMENT OF PRINCIPAL, IS SUBJECT TO OUR CREDITWORTHINESS. IF WE WERE TO DEFAULT ON OUR PAYMENT OBLIGATIONS, YOU MAY NOT RECEIVE ANY AMOUNTS OWED TO YOU UNDER THE NOTES AND YOU COULD LOSE YOUR ENTIRE INVESTMENT.

Coupon Observation Dates and Coupon Payment Dates*

Coupon Observation Dates	Coupon Payment Dates
October 23, 2017	October 25, 2017
January 22, 2018 ⁽¹⁾	January 24, 2018 ⁽²⁾
April 23, 2018 ⁽¹⁾	April 25, 2018 ⁽²⁾
July 23, 2018 ⁽¹⁾	July 25, 2018 ⁽²⁾
October 22, 2018 ⁽¹⁾	October 24, 2018 ⁽²⁾
January 22, 2019 ⁽¹⁾	January 24, 2019 ⁽²⁾
April 23, 2019 ⁽¹⁾	April 25, 2019 ⁽²⁾
July 22, 2019 ⁽³⁾	July 26, 2019 ⁽⁴⁾

(1) These Coupon Observation Dates are also Call Observation Dates.

(2) These Coupon Payment Dates are also Call Settlement Dates.

(3) This is also the Final Valuation Date.

(4) This is also the maturity date.

* Expected. Subject to the postponement if a market disruption event occurs as described under “General Terms of the Securities — Payment at Maturity” in the accompanying product prospectus supplement no. UBS-TPAOS-2.

Key Risks

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the Underlying. These risks are explained in more detail in the “Risk Factors” section of the accompanying product prospectus supplement no. UBS-TPAOS-2. We also urge you to consult your investment, legal, tax, accounting and other advisors before investing in the Notes.

Risks Relating to the Notes Generally

Risk of Loss at Maturity — The Notes differ from ordinary debt securities in that we will not necessarily repay the full principal amount of the Notes at maturity. If the Notes are not called, we will repay you the principal amount of your Notes in cash only if the Final Price of the Underlying is greater than or equal to the Downside Threshold, and will only make that payment at maturity. If the Notes are not called and the Final Price is less than the Downside Threshold, you will lose some or all of your initial investment in an amount proportionate to the decline in the price of the Underlying.

The Contingent Repayment of Principal Applies Only at Maturity — If the Notes are not automatically called, you should be willing to hold your Notes to maturity. If you are able to sell your Notes prior to maturity in the secondary market, if any, you may have to do so at a loss relative to your initial investment, even if the price of the Underlying is above the Downside Threshold.

You May Not Receive any Contingent Coupons — Royal Bank of Canada will not necessarily make periodic Contingent Coupon payments on the Notes. If the closing price of the Underlying on a Coupon Observation Date is less than the Coupon Barrier, we will not pay you the Contingent Coupon applicable to that Coupon Observation Date. If the closing price of the Underlying is less than the Coupon Barrier on each of the Coupon Observation Dates, we will not pay you any Contingent Coupons during the term of, and you will not receive a positive return on, your Notes. Generally, this non-payment of the Contingent Coupon coincides with a period of greater risk of principal loss on your Notes. Accordingly, if we do not pay the Contingent Coupon on the maturity date, you will incur a loss of principal, because the Final Price will be less than the Downside Threshold.

The Call Feature and the Contingent Coupon Feature Limit Your Potential Return — The return potential of the Notes is limited to the pre-specified Contingent Coupon Rate, regardless of the appreciation of the Underlying. In addition, the total return on the Notes will vary based on the number of Call Observation Dates on which the Contingent Coupon becomes payable prior to maturity or an automatic call. Further, if the Notes are called due to the automatic call feature, you will not receive any Contingent Coupons or any other payment in respect of any Call Observation Dates after the applicable Call Settlement Date. Since the Notes could be called as early as the first Call Observation Date, the total return on the Notes could be minimal. If the Notes are not called, you may be subject to the full downside performance of the Underlying even though your potential return is limited to the Contingent Coupon Rate. Generally, the longer the Notes are outstanding, the less likely it is that they will be automatically called due to the decline in the price of the Underlying and the shorter time remaining for the price of the Underlying to recover. As a result, the return on an investment in the Notes could be less than the return on a direct investment in the Underlying or on a similar security that allows you to participate in the appreciation of the price of the Underlying.

The Contingent Coupon Rate Per Annum Payable on the Notes Will Reflect in Part the Volatility of the Underlying, and May Not Be Sufficient to Compensate You for the Risk of Loss at Maturity — “Volatility” refers to the frequency and magnitude of changes in the price of the Underlying. The greater the volatility of the Underlying, the more likely it is that the price of that equity could close below the Downside Threshold on the Final Valuation Date. This risk will generally be reflected in a higher Contingent Coupon Rate for the Notes than the rate payable on our conventional debt securities with a comparable term. However, while the Contingent Coupon Rate will be set on the Trade Date, the Underlying’s volatility can change significantly over the term of the Notes, and may increase. The price of the Underlying could fall sharply as of the Final Valuation Date, which could result in a significant loss of your principal.

Reinvestment Risk — The Notes will be called automatically if the closing price of the Underlying is equal to or greater than the Initial Price on any Call Observation Date. In the event that the Notes are called prior to maturity, there is no guarantee that you will be able to reinvest the proceeds from an investment in the Notes at a comparable rate of return for a similar level of risk. To the extent you are able to reinvest your proceeds in an investment comparable to the Notes, you will incur transaction costs and the original issue price for such an investment is likely to include

certain built in costs such as dealer discounts and hedging costs.

The Notes Are Subject to Our Credit Risk — The Notes are subject to our credit risk, and our credit ratings and credit spreads may adversely affect the market value of the Notes. Investors are dependent on our ability to pay all amounts due on the Notes, and therefore investors are subject to our credit risk and to changes in the market's view of our creditworthiness. Any decline in our credit ratings or increase in the credit spreads charged by the market for taking our credit risk is likely to adversely affect the value of the Notes. If we were to default on our payment obligations, you may not receive any amounts owed to you under the Notes and you could lose your entire investment.

The Initial Estimated Value of the Notes Will Be Less than the Price to the Public — The initial estimated value for the Notes that is set forth on the cover page of this document, and that will be set forth in the final pricing supplement for the Notes, will be less than the public offering price you pay for the Notes and does not represent a minimum price at which we, RBCCM or any of our other 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 price of the Underlying, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to public of the underwriting discount, and our estimated profit and the 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 the price to public, as any such sale price would not be expected to include the underwriting discount and our estimated profit and the costs relating to our hedging of the Notes. In addition, any price at which you may sell the Notes is likely to reflect customary bid-ask spreads for similar trades. In addition to bid-ask spreads, the value of the Notes determined for any secondary market price is expected to be based on a secondary market rate rather than the internal borrowing rate used to price the Notes and determine the initial estimated value. As a result, the secondary market price will be less than if the internal borrowing 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.

Our Initial Estimated Value of the Notes Is an Estimate Only, Calculated as of the Time the Terms of the Notes Are 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 and the amount that may be paid at maturity.

Owning the Notes Is Not the Same as Owning the Underlying or the Stocks Comprising the Underlying or the Underlying's Underlying Index — The return on your Notes may not reflect the return you would realize if you actually owned the Underlying or stocks included in the Underlying or the Underlying's underlying index. As a holder of the Notes, you will not have voting rights or rights to receive dividends or other distributions or other rights that holders of the Underlying or these stocks would have, and any such dividends will not be incorporated in the determination of the underlying return.

The Policies of the Underlying's Investment Adviser Could Affect the Amount Payable on the Notes and Their Market Value: The policies of the Underlying's investment adviser concerning the management of the Underlying, additions, deletions or substitutions of the securities held by the Underlying could affect the market price of shares of the Underlying and, therefore, the amount payable on the Notes on the maturity date and the market value of the Notes before that date. The amount payable on the Notes and their market value could also be affected if the Underlying investment adviser changes these policies, for example, by changing the manner in which it manages the Underlying, or if the Underlying investment adviser discontinues or suspends maintenance of the Underlying, in which case it may become difficult to determine the market value of the Notes. The Underlying's investment adviser has no connection to the offering of the Notes and has no obligations to you as an investor in the Notes in making its decisions regarding the Underlying.

The Correlation Between the Performance of the Underlying and the Performance of the Underlying Index May Be Imperfect — The performance of the Underlying is linked principally to the performance of the Underlying Index. However, because of the potential discrepancies identified in more detail in the product prospectus supplement, the return on the Underlying may correlate imperfectly with the return on the Underlying Index. Further, the performance of the Underlying may not exactly replicate the performance of the Underlying Index, because the Underlying will reflect transaction costs and fees that are not included in the calculation of the Underlying Index. During periods of market volatility, securities included in the Underlying Index may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of the Underlying and the liquidity of the Underlying may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of the Underlying. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of the Underlying. As a result, under these circumstances, the market value of shares of the Underlying may vary substantially from the net asset value per share of the Underlying. For all of the foregoing reasons, the performance of the Underlying may not correlate with the performance of its Underlying Index as well as the net asset value per share of the Underlying, which could materially and adversely affect the value of the Notes in the secondary market and/or reduce your payment at maturity.

Historical Prices of the Underlying Should Not Be Taken as an Indication of its Future Prices During the Term of the Notes — The trading prices of the Underlying will determine the value of the Notes at any given time. As it is impossible to predict whether the price of the Underlying will rise or fall, trading prices of the common stocks held by the Underlying will be influenced by complex and interrelated political, economic, financial and other factors that can affect the issuers of those stocks, and therefore, the value of the Underlying.

There Can Be No Assurance that the Investment View Implicit in the Notes Will Be Successful — It is impossible to predict whether and the extent to which the price of the Underlying will rise or fall. The closing price of the Underlying will be influenced by complex and interrelated political, economic, financial and other factors that affect the Underlying. You should be willing to accept the downside risks of owning equities in general and the Underlying in particular, and the risk of losing some or all of your initial investment.

The Underlying and its Underlying Index Are Different: The performance of the Underlying may not exactly replicate the performance of the underlying index, because the Underlying will reflect transaction costs and fees that are not included in the calculation of the underlying index. It is also possible that the performance of the Underlying

may not fully replicate or may in certain circumstances diverge significantly from the performance of the underlying index due to the temporary unavailability of certain securities in the secondary market, the performance of any derivative instruments contained in the Underlying or due to other circumstances. The Underlying may use futures contracts, options, swap agreements, currency forwards and repurchase agreements in seeking performance that corresponds to the underlying index and in managing cash flows.

During periods of market volatility, securities underlying the Underlying may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of the Underlying and the liquidity of the Underlying may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of the Underlying. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of the Underlying. As a result, under these circumstances, the market value of shares of the Underlying may vary substantially from the net asset value per share of the Underlying. For all of the foregoing reasons, the performance of the Underlying may not correlate with the performance of its underlying index as well as the net asset value per share of the Underlying, 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 Underlying 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 Underlying, 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 the underlying index. Therefore, unless a specific security is removed from the underlying index, the Underlying generally would not sell a security because the security’s issuer was in financial trouble. In addition, the Underlying is subject to the risk that the investment strategy of the Underlying’s investment advisor may not produce the intended results.

The Stocks Included in the Underlying Index Are Concentrated in One Sector: All of the stocks included in the XOP’s underlying index are issued by companies in the oil and gas exploration and production sector. As a result, the stocks that will determine the performance of the underlying index, which the Underlying seeks to replicate, are concentrated in one sector. Although an investment in the Notes will not give holders any ownership or other direct interests in the stocks comprising the 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 the oil and gas exploration and production sector. Accordingly, by investing in the Notes, you will not benefit from the diversification which could result from an investment linked to companies that operate in multiple sectors.

Risks Associated with the Energy Sector: The Underlying invests in companies that develop and produce crude oil and natural gas and provide drilling and other energy resources production and distribution related services. Stock prices for these types of companies are affected by supply and demand both for their specific product or service and for energy products and services 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 performance of the Underlying.

Lack of Liquidity — The Notes will not be listed on any securities exchange. RBCCM intends to offer to purchase the Notes in the secondary market, but is not required to do so. Even if there is a secondary market, it may not provide enough liquidity to allow you to trade or sell the Notes easily. Because other dealers are not likely to make a secondary market for the Notes, the price at which you may be able to trade your Notes is likely to depend on the price, if any, at which RBCCM is willing to buy the Notes.

Potential Conflicts — We and our affiliates play a variety of roles in connection with the issuance of the Notes, including hedging our obligations under the Notes. In performing these duties, the economic interests of the calculation agent and other affiliates of ours are potentially adverse to your interests as an investor in the Notes.

Potentially Inconsistent Research, Opinions or Recommendations by RBCCM, UBS or Their Affiliates — RBCCM, UBS or their affiliates may publish research, express opinions or provide recommendations as to the Underlying that are inconsistent with investing in or holding the Notes, and which may be revised at any time. Any such research, opinions or recommendations could affect the value of the Underlying, and therefore the market value of the Notes.

Uncertain Tax Treatment — Significant aspects of the tax treatment of an investment in the Notes are uncertain. You should consult your tax adviser about your tax situation.

Potential Royal Bank of Canada and UBS Impact on Price — Trading or transactions by Royal Bank of Canada, UBS or our respective affiliates in the Underlying of the Underlying Index, or in futures, options, exchange-traded funds or other derivative products on the Underlying or the Underlying Index may adversely affect the market value of the Underlying, the closing price of the Underlying, and, therefore, the market value of the Notes.

The Terms of the Notes at Issuance and Their Market Value Prior to Maturity Will Be Influenced by Many Unpredictable Factors: Many economic and market factors will influence the terms of the Notes at issuance and their value prior to maturity. These factors are similar in some ways to those that could affect the value of a combination of instruments that might be used to replicate the payments on the Notes, including a combination of a bond with one or more options or other derivative instruments. For the market value of the Notes, we expect that, generally, the price of the Underlying 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 price of the Underlying. The value of the Notes will be affected by a number of other factors that may either offset or magnify each other, including:

the price of the Underlying;

the actual and expected volatility of the price of the Underlying;

the time remaining to maturity of the Notes;

the dividend rates on the securities held by the Underlying;

interest and yield rates in the market generally, as well as in each of the markets of the securities held by the Underlying;

a variety of economic, financial, political, regulatory or judicial events;

the occurrence of certain events with respect to the Underlying that may or may not require an adjustment to the terms of the Notes; and

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

Some or all of these factors will influence the terms of the Notes at issuance as well as the price you will receive if you choose to sell the 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 the Notes at a substantial discount from the principal amount if, for example, the price of the Underlying is at, below or not sufficiently above, its Downside Threshold.

The Anti-Dilution Protection for the Underlying Is Limited — The calculation agent will make adjustments to the Initial Price, Downside Threshold and Coupon Barrier for certain events affecting the shares of the Underlying.

However, the calculation agent will not be required to make an adjustment in response to all events that could affect the Underlying. If an event occurs that does not require the calculation agent to make an adjustment, the value of the Notes may be materially and adversely affected.

Hypothetical Examples

The hypothetical terms only. Actual terms may vary. See the cover page for actual offering terms. The following examples are hypothetical and provided for illustrative purposes only. They do not purport to be representative of every possible scenario concerning increases or decreases in the price of the Underlying relative to its Initial Price. Royal Bank of Canada cannot predict the Final Price of the Underlying. You should not take these examples as an indication or assurance of the expected performance of the Underlying. The numbers appearing in the examples and tables below have been rounded for ease of analysis. The following examples and tables illustrate the Payment at Maturity or upon an automatic call per Note on a hypothetical offering of the Notes, based on the following hypothetical assumptions (actual terms for the Notes will be set on the Trade Date):

Principal Amount:	\$10.00
Term:	Approximately two years
Hypothetical Initial Price*:	\$100.00
Hypothetical Contingent Coupon Rate:	8.00% per annum (or 2.00% per quarter), which is the low end of the Contingent Coupon Rate set forth above.
Hypothetical Contingent Coupon**:	\$0.20 per quarter
Coupon Observation Dates:	Quarterly
Call Observation Dates:	Quarterly (callable after 6 months)
Hypothetical Downside Threshold*:	\$65.00 (which is 65% of the Initial Price)
Hypothetical Coupon Barrier*:	\$65.00 (which is 65% of the Initial Price)

* May not be the actual Initial Price, Coupon Barrier or Downside Threshold applicable to the Notes. The actual Initial Price, Coupon Barrier and Downside Threshold will be determined on the Trade Date.

** Contingent Coupon payments, if payable, will be paid in arrears in equal quarterly installments during the term of the Notes unless earlier called.

Scenario #1: Notes Are Called on the Second Coupon Observation Date.

Date	Closing Price	Payment (per Note)
First Coupon Observation Date	\$105.00 (at or above Coupon Barrier and Initial Price)	\$0.20 (Contingent Coupon – not callable)
Second Coupon Observation Date	\$110.00 (at or above Coupon Barrier and Initial Price)	\$10.20 (Call Settlement Amount)
Total Payment:		\$10.40 (4.00% return)

Since the Notes are called on the second Coupon Observation Date, we will pay you on the Call Settlement Date a total of \$10.40 per Note, reflecting your principal amount plus the applicable Contingent Coupon. When added to the Contingent Coupon payment of \$0.20 received in respect of the prior Coupon Observation Date, we will have paid you a total of \$10.40 per Note, for a 4.00% total return on the Notes. No further amount will be owed to you under the Notes.

Scenario #2: Notes Are Called on the Third Coupon Observation Date.

Date	Closing Price	Payment (per Note)
First Coupon Observation Date	\$95.00 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not callable)
Second Coupon Observation Date	\$85.50 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not called)
Third Coupon Observation Date	\$105.00 (at or above Initial Price)	\$10.20 (Call Settlement Amount)

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Total Payment: \$10.60 (6.00% return)

Since the Notes are called on the third Coupon Observation Date, we will pay you on the Call Settlement Date a total of \$10.20 per Note, reflecting your principal amount plus the applicable Contingent Coupon. When added to the Contingent Coupon payments of \$0.40 received in respect of prior Coupon Observation Dates, we will have paid you a total of \$10.60 per Note, for a 6.00% total return on the Notes. No further amount will be owed to you under the Notes.

Scenario #3: Notes Are NOT Called and the Final Price of the Underlying Is at or Above the Downside Threshold.

Date	Closing Price	Payment (per Note)
First Coupon Observation Date	\$95.00 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not callable)
Second Coupon Observation Date	\$59.50 (below Coupon Barrier)	\$0.00 (not called)
Third Coupon Observation Date	\$81.00 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not called)
Fourth Coupon Observation Date	\$83.00 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not called)
Fifth through Seventh Coupon Observation Dates	Various (each below Coupon Barrier)	\$0.00 (not called)
Final Valuation Date	\$80.00 (at or above Downside Threshold and Coupon Barrier; below Initial Price)	\$10.20 (Payment at Maturity)
	Total Payment:	\$10.80 (8.00% return)

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At maturity, we will pay you a total of \$10.20 per Note, reflecting your principal amount plus the applicable Contingent Coupon. When added to the Contingent Coupon payments of \$0.60 received in respect of prior Coupon Observation Dates, we will have paid you a total of \$10.80 per Note, for an 8.00% total return on the Notes.

Scenario #4: Notes Are NOT Called and the Final Price of the Underlying Is Below the Downside Threshold

Date	Closing Price	Payment (per Note)
First Coupon Observation Date	\$95.00 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon– not callable)
Second Coupon Observation Date	\$85.50 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not called)
Third Coupon Observation Date	\$81.50 (at or above Coupon Barrier; below Initial Price)	\$0.20 (Contingent Coupon – not called)
Fourth through Seventh Coupon Observation Dates	Various (each below Coupon Barrier)	\$0.00 (not called)
Final Valuation Date	\$40.00 (below Downside Threshold and Coupon Barrier)	\$10.00 + [\$10.00 × underlying return] = \$10.00 + [\$10.00 × -60%] = \$10.00 - \$6.00 = \$4.00 (Payment at Maturity)

Total Payment: \$4.60 (-54.00% return)

Since the Notes are not called and the Final Price of the Underlying is below the Downside Threshold, we will pay you at maturity \$4.00 per Note. When added to the Contingent Coupon payments of \$0.60 received in respect of prior Coupon Observation Dates, we will have paid you \$4.60 per Note, for a loss on the Notes of 54.00%.

The Notes differ from ordinary debt securities in that, among other features, we are not necessarily obligated to repay the full amount of your initial investment. If the Notes are not called on any Call Observation Date, you may lose some or all of your initial investment. Specifically, if the Notes are not called and the Final Price is less than the Downside Threshold, you will lose 1% (or a fraction thereof) of your principal amount for each 1% (or a fraction thereof) that the underlying return is less than zero.

Any payment on the Notes, including payments in respect of an automatic call, Contingent Coupon or any repayment of principal provided at maturity, is dependent on our ability to satisfy our obligations when they come due. If we are unable to meet our obligations, you may not receive any amounts due to you under the Notes.

What Are the Tax Consequences of the Notes?

U.S. Federal Income Tax Consequences

The following, together with the discussion of U.S. federal income tax in the accompanying product prospectus supplement, prospectus supplement, and prospectus, is a general description of the material U.S. federal income tax consequences relating to an investment in the Notes. The following summary is not complete and is qualified in its entirety by the discussion under the section entitled “Supplemental Discussion of U.S. Federal Income Tax Consequences” in the accompanying product prospectus supplement no. UBS-TPAOS-2, the section entitled “Certain Income Tax Consequences” in the accompanying prospectus supplement, and the section entitled “Tax Consequences” in the accompanying prospectus, which you should carefully review prior to investing in the Notes.

In the opinion of our counsel, Morrison & Foerster LLP, it would generally be reasonable to treat the Notes as a callable pre-paid cash-settled contingent income-bearing derivative contract linked to the Underlying for U.S. federal income tax purposes, and the terms of the Notes require a holder and us (in the absence of a change in law or an administrative or judicial ruling to the contrary) to treat the Notes for all tax purposes in accordance with such characterization. Although the U.S. federal income tax treatment of the Contingent Coupons is uncertain, we intend to take the position, and the following discussion assumes, that such Contingent Coupons (including any coupon paid on or with respect to the call or maturity date) constitute taxable ordinary income to a U.S. holder at the time received or accrued in accordance with the holder’s regular method of accounting. If the Notes are treated as described above, subject to the potential application of the “constructive ownership” rules under Section 1260 of the Internal Revenue Code, a U.S. holder should generally recognize capital gain or loss upon the call, sale or maturity of the Notes in an amount equal to the difference between the amount a holder receives at such time (other than amounts properly attributable to any Contingent Coupon, which would be taxed, as described above, as ordinary income) and the holder’s tax basis in the Notes. Capital gain recognized by an individual U.S. holder is generally taxed at preferential rates where the property is held for more than one year and is generally taxed at ordinary income rates where the property is held for one year or less. The deductibility of capital losses is subject to limitations.

Alternative tax treatments are also possible and the Internal Revenue Service might assert that a treatment other than that described above is more appropriate. In addition, the Internal Revenue Service has released a notice that may affect the taxation of holders of the Notes. According to the notice, the Internal Revenue Service and the Treasury Department are actively considering whether the holder of an instrument such as the Notes should be required to accrue ordinary income on a current basis. It is not possible to determine what guidance they will ultimately issue, if any. It is possible, however, that under such guidance, holders of the Notes will ultimately be required to accrue income currently and this could be applied on a retroactive basis. The Internal Revenue Service and the Treasury Department are also considering other relevant issues, including whether additional gain or loss from such instruments should be treated as ordinary or capital and whether the special “constructive ownership rules” of Section 1260 of the Internal Revenue Code might be applied to such instruments. Holders are urged to consult their tax advisors concerning the significance, and the potential impact, of the above considerations.

Individual holders that own “specified foreign financial assets” may be required to include certain information with respect to such assets with their U.S. federal income tax return. You are urged to consult your own tax advisor regarding such requirements with respect to the Notes.

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, U.S. Treasury Department regulations 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, 2018. 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 Underlying or the Notes, 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 Underlying 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.

The Notes are not intended for purchase by any investor that is not a United States person, as that term is defined for U.S. federal income tax purposes, and the underwriters will not make offers of the Notes to any such investor.

Canadian Federal Income Tax Consequences

For a discussion of the material Canadian federal income tax consequences relating to an investment in the Notes, please see the section entitled "Tax Consequences—Canadian Taxation" in the accompanying prospectus, which you should carefully review prior to investing in the Notes.

Information About the Underlying

Included on the following pages is a brief description of the Underlying. This information has been obtained from publicly available sources. Set forth below is a table that provides the quarterly high and low closing prices for the Underlying. We obtained the closing price information set forth below from the Bloomberg Professional® service (“Bloomberg”) without independent verification. You should not take the historical prices of the Underlying as an indication of future performance.

The Underlying is registered under the Securities Exchange Act of 1934, as amended (the “Exchange Act”) and the Investment Company Act of 1940, as amended (the “Investment Company Act”). Companies with securities registered under the Exchange Act and the Investment Company Act are required to file financial and other information specified by the SEC periodically. Information filed by the Underlying with the SEC can be reviewed electronically through a web site maintained by the SEC. The address of the SEC’s website is <http://www.sec.gov>. Information filed with the SEC by the issuer of the Underlying under the Exchange Act can be located by reference to its SEC Central Index Key number provided below. In addition, information filed with the SEC can be inspected and copied at the Public Reference Section of the SEC, 100 F Street, N.E., Room 1580, Washington, D.C. 20549. Copies of this material can also be obtained from the Public Reference Section, at prescribed rates. Information from outside sources is not incorporated by reference in, and should not be considered part of, this free writing prospectus or any accompanying prospectus or prospectus supplement. We have not independently reviewed the accuracy or completeness of the information contained in outside sources.

SPDR S&P® Oil & Gas Exploration & Production ETF

We have derived the following information regarding the Underlying from publicly available documents. We have not independently verified the accuracy or completeness of the following information. We are not affiliated with the Underlying and the Underlying will have no obligations with respect to the Notes. This pricing supplement relates only to the Notes and does not relate to the shares of the Underlying or any securities held by the underlying index. Neither we nor our affiliates participate in the preparation of the publicly available documents described below. Neither we nor our affiliates have made any due diligence inquiry with respect to the Underlying in connection with the offering of the Notes. There can be no assurance that all events occurring prior to the date of this free writing prospectus, including events that would affect the accuracy or completeness of the publicly available documents described below, that would affect the trading price of the shares of the Underlying have been or will be publicly disclosed. Subsequent disclosure of any events or the disclosure of or failure to disclose material future events concerning the Underlying could affect the price of the shares of the Underlying after the pricing date, and therefore could affect the payment at maturity.

The selection of the Underlying is not a recommendation to buy or sell the shares of the Underlying. Neither we nor any of our affiliates make any representation to you as to the performance of the shares of the Underlying.

The SPDR S&P® Oil & Gas Exploration & Production ETF

The Underlying is an investment portfolio maintained and managed by SSFM. The Underlying trades on the NYSE Arca under the ticker symbol “XOP.” The inception date of the Underlying is June 19, 2006. Prior to January 8, 2007, the Underlying was known as the SPDR® Oil & Gas Exploration & Production ETF.

The Underlying seeks to provide investment results that correspond generally to the price and yield performance, before fees and expenses, of the underlying index. The underlying index represents the oil and gas exploration and production sub-industry portion of the S&P Total Market Index (“S&P TMI”), an index that measures the performance of the U.S. equity market. The Underlying is composed of companies that are in the oil and gas sector exploration and production.

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

The information above was compiled from the SPDR® website. We have not independently investigated the accuracy of that information. Information contained in the SPDR® website is not incorporated by reference in, and should not be considered a part of, this document.

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, 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 TMI. The S&P TMI includes all U.S. common equities listed on the NYSE (including NYSE Arca), the NYSE MKT, 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.

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.

Historical Information

The following table sets forth the quarterly high, low and period-end closing prices for the Underlying, based on daily closing prices, as reported by Bloomberg L.P. The historical performance of the Underlying should not be taken as an indication of its future performance during the term of the Notes.

Quarter Begin	Quarter End	Quarterly Closing High	Quarterly Closing Low	Quarterly Period-End Close
1/1/2008	3/31/2008	\$55.83	\$44.79	\$53.73
4/1/2008	6/30/2008	\$71.31	\$54.44	\$70.15
7/1/2008	9/30/2008	\$70.93	\$42.68	\$44.83
10/1/2008	12/31/2008	\$43.38	\$22.97	\$29.64
1/1/2009	3/31/2009	\$33.48	\$23.41	\$26.60
4/1/2009	6/30/2009	\$38.25	\$27.54	\$31.72
7/1/2009	9/30/2009	\$39.61	\$28.51	\$38.62
10/1/2009	12/31/2009	\$43.36	\$36.91	\$41.21
1/1/2010	3/31/2010	\$44.07	\$39.22	\$42.13
4/1/2010	6/30/2010	\$45.82	\$38.57	\$38.99
7/1/2010	9/30/2010	\$42.85	\$38.05	\$42.26
10/1/2010	12/31/2010	\$52.71	\$42.18	\$52.69
1/1/2011	3/31/2011	\$64.50	\$52.75	\$64.50
4/1/2011	6/30/2011	\$64.97	\$54.71	\$58.78
7/1/2011	9/30/2011	\$65.24	\$42.80	\$42.80
10/1/2011	12/31/2011	\$57.56	\$39.99	\$52.69
1/1/2012	3/31/2012	\$61.34	\$52.67	\$56.91
4/1/2012	6/30/2012	\$57.85	\$45.20	\$50.40
7/1/2012	9/30/2012	\$59.35	\$48.73	\$55.69
10/1/2012	12/31/2012	\$57.38	\$50.69	\$54.07
1/1/2013	3/31/2013	\$62.10	\$55.10	\$60.49
4/1/2013	6/30/2013	\$62.61	\$54.71	\$58.18
7/1/2013	9/30/2013	\$66.47	\$58.62	\$65.89
10/1/2013	12/31/2013	\$72.74	\$65.02	\$68.53
1/1/2014	3/31/2014	\$71.83	\$64.04	\$71.83
4/1/2014	6/30/2014	\$83.45	\$71.19	\$82.28
7/1/2014	9/30/2014	\$82.08	\$68.83	\$68.83
10/1/2014	12/31/2014	\$66.84	\$42.75	\$47.86
1/1/2015	3/31/2015	\$53.94	\$42.55	\$51.66
4/1/2015	6/30/2015	\$55.63	\$46.43	\$46.66
7/1/2015	9/30/2015	\$45.22	\$31.71	\$32.84
10/1/2015	12/31/2015	\$40.53	\$28.64	\$30.22
1/1/2016	3/31/2016	\$30.96	\$23.60	\$30.35
4/1/2016	6/30/2016	\$37.50	\$29.23	\$34.81
7/1/2016	9/30/2016	\$39.12	\$32.75	\$38.46
10/1/2016	12/31/2016	\$43.42	\$34.73	\$41.42
1/1/2017	3/31/2017	\$42.21	\$35.17	\$37.44
4/1/2017	6/30/2017	\$37.89	\$30.17	\$31.92
7/1/2017	7/12/2017*	\$32.61	\$30.66	\$31.40

* This free writing prospectus includes information for the third calendar quarter of 2017 only for the period from July 1, 2017 through July 12, 2017. Accordingly, the “Quarterly Closing High,” “Quarterly Closing Low” and “Quarterly Period-End Close” data indicated are for this shortened period only and do not reflect complete data for the third calendar quarter of 2017.

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The graph below illustrates the performance of the Underlying from January 1, 2008 to July 12, 2017, assuming an Initial Price of \$31.40, which was its closing price on July 12, 2017. The solid line represents the hypothetical Coupon Barrier and Downside Threshold of \$20.41, which is equal to 65.00% of the closing price on July 12, 2017 (rounded to two decimal places). The actual Coupon Barrier and Downside Threshold will be based on the closing price of the Underlying on the Trade Date.

n Coupon Barrier / Downside Threshold = 65.00%

HISTORIC PERFORMANCE IS NOT AN INDICATION OF FUTURE PERFORMANCE.

Source: Bloomberg L.P. We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets.

Supplemental Plan of Distribution (Conflicts of Interest)

We have agreed to indemnify UBS and RBCCM against liabilities under the Securities Act of 1933, as amended, or to contribute payments that UBS and RBCCM may be required to make relating to these liabilities as described in the prospectus supplement and the prospectus. We will agree that UBS Financial Services Inc. may sell all or a part of the Notes that it will purchase from us to investors at the price to public or to its affiliates at the price indicated on the cover of the pricing supplement, the document that will be filed under Rule 424(b)(2) containing the final pricing terms of the Notes.

Subject to regulatory constraints and market conditions, RBCCM intends to offer to purchase the Notes in the secondary market, but it is not required to do so.

We or our affiliates may enter into swap agreements or related hedge transactions with one of our other affiliates or unaffiliated counterparties in connection with the sale of the Notes and RBCCM and/or an affiliate may earn additional income as a result of payments pursuant to the swap or related hedge transactions. See “Use of Proceeds and Hedging” in the accompanying product prospectus supplement no. UBS-TPAOS-2.

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. If so specified in the pricing supplement related to the Notes, for a period of approximately eight 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 be a higher amount, potentially reflecting the addition of the underwriting discount and our estimated costs and profits from hedging the Notes. Any such 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. This period may be reduced at RBCCM’s discretion based on a variety of factors, including but not limited to, the amount of the Notes that we repurchase and our negotiated arrangements from time to time with UBS.

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 January 8, 2016.

Structuring the Notes

The Notes are our debt securities, the return on which is linked to the performance of the Underlying. 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 is likely to result in a higher initial estimated value of the Notes at the time their terms are set than if the secondary market rate was used. Unlike the estimated value included on the cover of this document or in the final pricing supplement relating to the Notes, any value of the Notes determined for purposes of a secondary market transaction may be based on a different borrowing rate, which may result in a lower value for the Notes than if our initial internal borrowing 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 Underlying, 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 reduces 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 result in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Key Risks—The Initial Estimated Value of the Notes Will Be Less than the Price to the Public” above.

Terms Incorporated in Master Note

The terms appearing above under the caption “Indicative Terms of the Notes” and the provisions in the accompanying product prospectus supplement no. UBS-TPAOS-2 dated January 20, 2016 under the caption “General Terms of the Securities” are incorporated into the master note issued to DTC, the registered holder of the Notes.