

RSP Permian, Inc.
Form 424B5
October 07, 2015

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This preliminary prospectus supplement and the accompanying prospectus relate to an effective registration statement filed with the Securities and Exchange Commission, but is not complete and may be changed. This preliminary prospectus supplement and the accompanying prospectus are not an offer to sell the securities described herein, and are not soliciting an offer to buy such securities, in any state or jurisdiction where such offer or sale is not permitted.

Subject to Completion, dated October 7, 2015

PROSPECTUS SUPPLEMENT
(To Prospectus dated March 17, 2015)

6,000,000 Shares

RSP Permian, Inc.

Common Stock

We are offering 6,000,000 shares of our common stock.

Our common stock is listed on the New York Stock Exchange under the symbol "RSPP". On October 6, 2015, the last sale price of our common stock as reported on the New York Stock Exchange was \$26.59 per share.

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 and have elected to take advantage of certain reduced public company reporting requirements.

Investing in our common stock involves risks. See "Risk Factors" beginning on page S-5 of this prospectus supplement.

Price to Public	Underwriting	Proceeds to Us
	Discounts and	

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		Commissions	
Per Share	\$	\$	\$
Total	\$	\$	\$

The underwriter also has the option to purchase up to an additional 900,000 shares from us, at the public offering price, less the underwriting discount, within 30 days from the date of this prospectus supplement. We refer you to the "Underwriting" section beginning on Page S-20 of this prospectus supplement for additional information regarding underwriting compensation.

The shares are expected to be ready for delivery on or about October , 2015.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the securities described herein or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

Goldman, Sachs & Co.

Prospectus Supplement dated October , 2015

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document is in two parts. The first part is this prospectus supplement, which describes the specific terms of this offering. The second part, the accompanying prospectus, gives more general information, some of which may not apply to this offering. Generally, when we refer to the prospectus, we are referring to this prospectus supplement and the accompanying prospectus combined. You should read the entire prospectus supplement, as well as the accompanying prospectus and the documents incorporated by reference that are described under "Incorporation by Reference" in this prospectus supplement. To the extent that any statement we make in this prospectus supplement is inconsistent with statements made in the accompanying prospectus or any documents incorporated by reference herein, you should rely on the information contained in this prospectus supplement, which will be deemed to modify or supersede those made in the accompanying prospectus or documents incorporated by reference herein or therein.

You should rely only on the information contained or incorporated by reference in this prospectus supplement and the accompanying prospectus or to which we have referred you. We have not and the underwriter has not, authorized any other person to provide you with information different from that contained in this prospectus supplement and the accompanying prospectus. If anyone provides you with different or inconsistent information, you should not rely on it. We and the underwriter are only offering to sell, and only seeking offers to buy, shares of our common stock in jurisdictions where offers and sales are permitted.

The information contained in this prospectus supplement and the accompanying prospectus or in any document incorporated herein or therein is accurate and complete only as of the date hereof or thereof, respectively, regardless of the time of delivery of this prospectus supplement and the accompanying prospectus or of any sale of our common stock by us or the underwriter. Our business, financial condition, results of operations and prospects may have changed since those dates.

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CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

The information in this prospectus supplement and the accompanying prospectus, including in the documents incorporated by reference herein and therein, includes forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical fact contained in this prospectus supplement or the accompanying prospectus, or the documents incorporated by reference herein or therein, regarding our strategy, future operations, financial position, estimated revenues and losses, projected costs, prospects, plans and objectives of management are forward-looking statements. When used, the words "could", "believe", "anticipate", "intend", "estimate", "expect", "project" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain such identifying words. These forward-looking statements are based on management's current expectations and assumptions about future events and are based on currently available information as to the outcome and timing of future events. When considering forward-looking statements, you should keep in mind the risk factors and other cautionary statements described under "Risk Factors" in this prospectus supplement, the accompanying prospectus, our most recent Annual Report on Form 10-K (the "Form 10-K") and any subsequent Quarterly Report on Form 10-Q. Should one or more of these risks or uncertainties occur, or should underlying assumptions prove incorrect, our actual results and plans could differ materially from those expressed in any forward looking statements.

Forward-looking statements may include statements about:

our business strategy;

our reserves;

our exploration and development drilling prospects, inventories, projects and programs;

our ability to replace the reserves we produce through drilling and property acquisitions;

our financial strategy, liquidity and capital required for our development program;

our realized oil, natural gas liquid ("NGL") and natural gas prices;

the timing and amount of future production of oil, NGLs and natural gas;

our hedging strategy and results;

our future drilling plans;

our competition and government regulations;

our ability to obtain permits and governmental approvals;

our pending legal or environmental matters;

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our marketing of oil, NGLs and natural gas;

our leasehold or business acquisitions, including the Possible Acquisition;

costs of developing our properties;

general economic conditions;

credit markets;

uncertainty regarding our future operating results; and

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our plans, objectives, expectations and intentions that are not historical.

We caution you that these forward-looking statements are subject to all of the risks and uncertainties, most of which are difficult to predict and many of which are beyond our control, incident to the exploration for and development, production, gathering and sale of oil, NGLs and natural gas. These risks include, but are not limited to, commodity price volatility, inflation, lack of availability of drilling and production equipment and services, environmental risks, drilling and other operating risks, regulatory changes, the uncertainty inherent in estimating reserves and in projecting future rates of production, cash flow and access to capital, the timing of development expenditures and the other risks described under "Risk Factors" in this prospectus supplement, the accompanying prospectus, the Form 10-K and any subsequent Quarterly Report on Form 10-Q.

Reserve engineering is a process of estimating underground accumulations of oil, NGLs and natural gas that cannot be measured in an exact way. The accuracy of any reserve estimate depends on the quality of available data, the interpretation of such data and price and cost assumptions made by reserve engineers. In addition, the results of drilling, testing and production activities may justify revisions of estimates that were made previously. If significant, such revisions would change the schedule of any further production and development drilling. Accordingly, reserve estimates may differ significantly from the quantities of oil, NGLs and natural gas that are ultimately recovered.

All forward-looking statements, expressed or implied, attributable to us or persons acting on our behalf are expressly qualified in their entirety by this cautionary statement. This cautionary statement should also be considered in connection with any subsequent written or oral forward-looking statements that we or persons acting on our behalf may issue.

All forward-looking statements speak only as of the date they are made. Except as otherwise required by applicable law, we disclaim any duty to update any forward-looking statements, all of which are expressly qualified by the statements in this section, to reflect events or circumstances after the date of this prospectus supplement.

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PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights information contained elsewhere in, or incorporated by reference into, this prospectus supplement and the accompanying prospectus. It does not contain all of the information that may be important to you. Before deciding whether to invest in our common stock, for a more complete understanding of our business and this offering, you should read carefully this entire prospectus supplement, the accompanying prospectus, the information incorporated by reference herein and therein, and any other documents to which we refer. You should pay special attention to the "Risk Factors" section of this prospectus supplement, the accompanying prospectus, the Form 10-K and any subsequent Quarterly Report on Form 10-Q to determine whether an investment in our common stock is appropriate for you. As used in this prospectus supplement, unless the context otherwise requires, references to the "Company", "RSP", "we", "us" and "our" refer to RSP Permian, Inc. and, where appropriate, its subsidiary, RSP Permian, L.L.C. Unless we indicate otherwise, the information presented in this prospectus supplement assumes no exercise of the underwriter's option to purchase additional shares.

Overview

We are an independent oil and natural gas company focused on the acquisition, exploration, development and production of unconventional oil and associated liquids-rich natural gas reserves in the Permian Basin of West Texas. The vast majority of our acreage is located on large, contiguous acreage blocks in the core of the Midland Basin, a sub-basin of the Permian Basin, primarily in the adjacent counties of Midland, Martin, Andrews, Dawson, Ector and Glasscock. For more information about our business, operations and financial results, see the documents listed under "Where You Can Find Additional Information".

Recent Developments

Acquisitions

In August and September 2015, in a series of acquisitions, we acquired approximately 6,600 net surface acres, or approximately 32,000 net effective horizontal acres, with average production of approximately 1.6 MBoe/d for the three months ended June 30, 2015 and 191 net horizontal locations for approximately \$313.0 million

On October 6, 2015, we signed a letter of intent to acquire undeveloped acreage and oil and natural gas producing properties in the core of the Midland Basin from Wolfberry Partners Resources LLC, a Texas limited liability company, for an approximate aggregate purchase price of \$137.0 million in cash (subject to certain customary purchase price adjustments) (the "Possible Acquisition"), \$60.0 million of which would be payable upon the consummation of the acquisition and the remainder of which would be payable within nine months thereafter and would bear interest at the greater of 2.1% per annum or LIBOR plus 1.5%. The Possible Acquisition includes approximately 4,100 net surface acres, or approximately 15,000 net effective horizontal acres, with average production of approximately 1.9 MBoe/d in August 2015, 86 net horizontal locations in five zones with average lateral length of approximately 8,100 feet and 25 producing wells (four horizontal wells in four zones and 21 vertical wells). These properties are 100% operated by an affiliate of Wolfberry Partners Resources LLC and are largely contiguous, allowing for drilling of longer laterals and efficient infrastructure development. Ted Collins, Jr. owns approximately 40.9% of Wolfberry Partners Resources LLC, and Michael W. Wallace, through Wallace Family Partnership, LP, owns approximately 30.7% of Wolfberry Partners Resources LLC. Messrs. Collins and Wallace are also members of our board of directors and two of our three largest stockholders, currently beneficially owning approximately 22.9% of our common stock in the aggregate. Due to the related party nature of the Possible Acquisition, the disinterested members of our board of directors are

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evaluating the Possible Acquisition, and these members have hired an investment banking advisory firm to advise them and render an opinion as to the fairness of this acquisition. If an agreement is ultimately reached, we currently expect to consummate the Possible Acquisition in the first half of the fourth quarter of 2015, and we expect to fund this acquisition with cash on hand, borrowings under our revolving credit facility and a portion of the net proceeds from this offering. However, there can be no assurances that an agreement for the Possible Acquisition will be reached on the terms described herein or at all. This offering is not conditioned on the consummation of the Possible Acquisition. Please see "Risk Factors Risks Related to this Offering, Our Common Stock and Our Business We may fail to consummate the Possible Acquisition."

Production Update

Our average net daily production for the third quarter of 2015 was 23,500-24,000 Boe/d (approximately 75% oil), a 110%-114% increase over our average net daily production for the third quarter of 2014, which was 11,217 Boe/d, and an 18%-21% sequential quarterly growth rate over our average net daily production for the second quarter of 2015, which was 19,879 Boe/d.

Based on continued strong well performance and successful spacing pilots, we have increased internal estimates for type curves and estimated ultimate recovery for wells drilled in the Middle Spraberry, Lower Spraberry and Wolfcamp A zones above those reviewed by our independent petroleum engineers at December 31, 2014.

Corporate Information

Our principal executive offices are located at 3141 Hood Street, Suite 500, Dallas, Texas 75219, and our telephone number at that address is (214) 252-2700. Our website address is www.rsppermian.com. Our periodic reports and other information filed with or furnished to the Securities and Exchange Commission (the "SEC") are available free of charge through our website as soon as reasonably practicable after those reports and other information are electronically filed with or furnished to the SEC. Except for information specifically incorporated by reference into this prospectus supplement that may be accessed from our website, the information on, or otherwise accessible through, our website or any other website does not constitute a part of this prospectus supplement.

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The Offering

Issuer	RSP Permian, Inc.
Shares of common stock offered by us	6,000,000 shares (6,900,000 shares if the underwriter exercises in full its option to purchase additional shares).
Option to purchase additional shares	We have granted the underwriter an option to purchase up to an additional 900,000 shares of common stock.
Shares of common stock to be outstanding immediately after this offering(1)	98,065,451 shares (98,965,451 shares if the underwriter exercises in full its option to purchase additional shares).
Use of proceeds	We estimate that, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, we will receive approximately \$ million of net proceeds from this offering, or \$ million if the underwriter exercises in full its option to purchase additional shares. We intend to use the net proceeds from this offering first to fund a portion of the purchase price of the Possible Acquisition, if consummated, and the balance for general corporate purposes, which may include funding our drilling and development program. The Possible Acquisition is subject to the approval of the disinterested members of our board of directors, the receipt of a fairness opinion from an investment banking advisory firm and the satisfaction of other customary closing conditions. There can be no assurances that such approval, opinion or these conditions will be satisfied, that an agreement for the Possible Acquisition will be reached on the terms described herein or at all, or that the Possible Acquisition will be consummated. This offering is not conditioned on the consummation of the Possible Acquisition. Please read "Use of Proceeds".
Dividend policy	We do not currently pay, and do not anticipate paying in the future, any cash dividends on our common stock. In addition, our revolving credit facility and the indenture governing our outstanding senior notes place restrictions on our ability to pay cash dividends. Please read "Dividend Policy" in this prospectus supplement.

(1) Includes 798,185 shares of restricted stock that have been awarded to our directors and certain of our employees and consultants, which are deemed non-dilutive under the two-class method associated with participating equity securities and therefore do not increase the diluted share count for financial reporting purposes.

Does not include shares of common stock reserved for issuance pursuant to our equity incentive plan.

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Risk factors

Investing in our common stock involves risks. Before deciding to invest in our common stock, you should carefully read and consider the information set forth in the "Risk Factors" and "Cautionary Statement Regarding Forward-Looking Statements" sections of this prospectus supplement and the "Risk Factors" section of the Form 10-K and any subsequent Quarterly Report on Form 10-Q, and all other information set forth in, or incorporated by reference into, this prospectus supplement.

Listing and trading symbol

RSPP.

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RISK FACTORS

Investing in our common stock involves a high degree of risk. Before deciding whether to purchase shares of our common stock, you should carefully consider the risks and uncertainties described below as well as those described under "Risk Factors" in the Form 10-K and any subsequent Quarterly Report on Form 10-Q, together with all of the other information included in, or incorporated by reference into, this prospectus. See "Incorporation by Reference". If any of these risks actually occur, our business, financial condition and results of operations could be materially and adversely affected and we may not be able to achieve our goals, the value of our securities could decline and you could lose some or all of your investment. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations.

Risks Related to this Offering, Our Common Stock and Our Business

The price of our common stock in this offering may not be indicative of the market price of our common stock after this offering and may fluctuate significantly.

The market price of our common stock could vary significantly as a result of a number of factors, some of which are beyond our control. In the event of a drop in the market price of our common stock, you could lose a substantial part or all of your investment in our common stock. The price of our common stock in this offering will be negotiated between us and the underwriter and may not be indicative of the market price of our common stock after this offering. Consequently, you may not be able to sell shares of our common stock at prices equal to or greater than the price paid by you in this offering.

The following factors could affect our stock price:

our operating and financial performance and drilling locations, including reserve estimates;

quarterly variations in the rate of growth of our financial indicators, such as net income per share, net income and revenues;

the public reaction to our press releases, our other public announcements and our filings with the SEC;

our failure to consummate the Possible Acquisition on the terms described herein;

strategic actions by our competitors;

changes in revenue or earnings estimates, or changes in recommendations or withdrawal of research coverage, by equity research analysts;

speculation in the press or investment community;

the failure of research analysts to cover our common stock;

sales of our common stock by us or other stockholders, or the perception that such sales may occur;

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changes in accounting principles, policies, guidance, interpretations or standards;

additions or departures of key management personnel;

actions by our stockholders;

general market conditions, including fluctuations in commodity prices;

domestic and international economic, legal and regulatory factors unrelated to our performance; and

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the realization of any risks described in this "Risk Factors" section or in the "Risk Factors" section in the Form 10-K or any subsequent Quarterly Report on Form 10-Q.

The stock markets in general have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. These broad market fluctuations may adversely affect the trading price of our common stock. Securities class action litigation has often been instituted against companies following periods of volatility in the overall market and in the market price of a company's securities. Such litigation, if instituted against us, could result in very substantial costs, divert our management's attention and resources and harm our business, operating results and financial condition.

We may not consummate the Possible Acquisition, and this offering is not conditioned on the consummation of the Possible Acquisition.

We intend to use a portion of the net proceeds of this offering to fund a portion of the purchase price of the Possible Acquisition described above under "Prospectus Supplement Summary Recent Developments Acquisitions." However, this offering is not conditioned on the consummation of the Possible Acquisition, which is subject to the approval of the disinterested members of our board of directors, the receipt of a fairness opinion from an investment banking advisory firm and the satisfaction of other customary closing conditions. There can be no assurances that such approval, opinion or these conditions will be satisfied, that an agreement for the Possible Acquisition will be reached on the terms described in "Prospectus Supplement Summary Recent Developments Acquisitions" or at all, or that the Possible Acquisition will be consummated.

This offering is not conditioned on the consummation of the Possible Acquisition. Therefore, upon the closing of this offering, you will become a holder of our common stock regardless of whether the Possible Acquisition is consummated, delayed or terminated. If the Possible Acquisition is delayed or terminated or consummated on terms different than those described herein, the price of our common stock may decline to the extent that the current market price of our common stock reflects a market assumption that Possible Acquisition will be consummated on the terms described herein. In addition, if the Possible Acquisition is not consummated, our management will have broad discretion in the application of the net proceeds of this offering and could apply the proceeds in ways that you or other stockholders may not approve, which could adversely affect the market price of our common stock.

A small number of our stockholders hold a substantial portion of our outstanding common stock.

Prior to this offering, three of our largest stockholders, Ted Collins, Jr. ("Collins"), Wallace Family Partnership, LP ("Wallace LP") and ACTOIL, LLC (such stockholders collectively, the "Principal Investors") hold approximately 32% of our common stock in the aggregate, and immediately following the completion of this offering, assuming no exercise of the underwriter's option to purchase additional shares of our common stock, the Principal Investors will collectively hold approximately 30% of our common stock. Furthermore, in connection with the closing of our initial public offering, we entered into a stockholders' agreement with RSP Permian Holdco, L.L.C. (which has since assigned its rights and obligations thereunder to Production Opportunities II, L.P. ("Production Opportunities")), Collins, Wallace LP, Rising Star Development Co., L.L.C. (which has since assigned its rights and obligations thereunder to Natural Gas Partners VIII, L.P.) and Pecos Energy Partners, L.P. The stockholders' agreement provides each of Collins and Wallace LP with the right to designate a nominee to our board of directors so long as each beneficially owns at least five percent of the outstanding shares of our common stock. Prior to this offering, Collins and Wallace LP each have the right to designate one nominee. After this offering, assuming either no

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exercise or full exercise of the underwriter's option to purchase additional shares of our common stock, Collins and Wallace LP will continue to have the right to designate one nominee each to our board of directors. The existence of significant stockholders and the stockholders' agreement may have the effect of deterring hostile takeovers, delaying or preventing changes in control or changes in management, or limiting the ability of our other stockholders to approve transactions that they may deem to be in the best interests of our company. Moreover, this concentration of stock ownership may adversely affect the trading price of our common stock to the extent investors perceive a disadvantage in owning stock of a company with significant stockholders.

Conflicts of interest could arise in the future between us, on the one hand, and the Principal Investors or their respective affiliates, on the other hand, concerning, among other things, potential competitive business activities or business opportunities.

Certain Principal Investors and certain of their affiliates have made and may continue to make investments in the U.S. oil and gas industry from time to time. As a result, certain Principal Investors and their respective affiliates have and may, from time to time, acquire interests in businesses that directly or indirectly compete with our business, as well as businesses that are significant existing or potential customers. Certain Principal Investors and their respective affiliates may acquire or seek to acquire assets that we seek to acquire and, as a result, those acquisition opportunities may not be available to us or may be more expensive for us to pursue.

Our amended and restated certificate of incorporation and our amended and restated bylaws, as well as Delaware law, contain provisions that could discourage acquisition bids or merger proposals, which may adversely affect the market price of our common stock.

Our amended and restated certificate of incorporation authorizes our board of directors to issue preferred stock without stockholder approval. If our board of directors elects to issue preferred stock, it could be more difficult for a third party to acquire us. In addition, some provisions of our amended and restated certificate of incorporation and our amended and restated bylaws could make it more difficult for a third party to acquire control of us, even if the change of control would be beneficial to our stockholders, including:

limitations on the removal of directors;

limitations on the ability of our stockholders to call special meetings;

establishing advance notice provisions for stockholder proposals and nominations for elections to the board of directors to be acted upon at meetings of stockholders;

providing that the board of directors is expressly authorized to adopt, or to alter or repeal our bylaws; and

establishing advance notice and certain information requirements for nominations for election to our board of directors or for proposing matters that can be acted upon by stockholders at stockholder meetings.

Our amended and restated certificate of incorporation designates the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, employees or agents.

Our amended and restated certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will, to the fullest extent permitted by applicable law, be the sole and exclusive forum for (i) any

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derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, employees or agents to us or our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware, our amended and restated certificate of incorporation or our amended and restated bylaws, or (iv) any action asserting a claim against us that is governed by the internal affairs doctrine, in each such case subject to such Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of, and consented to, the provisions of our amended and restated certificate of incorporation described in the preceding sentence. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, employees or agents, which may discourage such lawsuits against us and such persons. Alternatively, if a court were to find these provisions of our amended and restated certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business, financial condition or results of operations.

We do not intend to pay cash dividends on our common stock, and our revolving credit facility and the indenture governing our outstanding senior notes place certain restrictions on our ability to do so. Consequently, your only opportunity to achieve a return on your investment is if the price of our common stock appreciates.

We do not plan to declare cash dividends on shares of our common stock in the foreseeable future. Additionally, our revolving credit facility and the indenture governing our outstanding senior notes place certain restrictions on our ability to pay cash dividends. Consequently, your only opportunity to achieve a return on your investment in us will be if you sell your common stock at a price greater than you paid for it. There is no guarantee that the price of our common stock that will prevail in the market will ever exceed the price that you pay in this offering.

Future sales of our common stock in the public market, or the perception that such sales may occur, could reduce our stock price, and any additional capital raised by us through the sale of equity or convertible securities may dilute your ownership in us.

We may sell additional shares of common stock or convertible securities in subsequent offerings. We cannot predict the size of future issuances of our common stock or securities convertible into common stock or the effect, if any, that future issuances and sales of shares of our common stock will have on the market price of our common stock. Sales of substantial amounts of our common stock (including shares issued in connection with an acquisition), or the perception that such sales could occur, may adversely affect prevailing market prices of our common stock.

On February 4, 2014, we filed a registration statement with the SEC on Form S-8 providing for the registration of 10,000,000 shares of our common stock issued or reserved for issuance under our equity incentive plan. Subject to the satisfaction of vesting conditions, the expiration or waiver of lock-up agreements and the requirements of Rule 144 under the Securities Act, shares registered under the registration statement on Form S-8 will be available for resale immediately in the public market without restriction.

Following the completion of this offering, and assuming no exercise of the underwriter's option to purchase additional shares, the Principal Investors will own approximately 30% of our total outstanding shares. The Principal Investors are a party to a registration rights agreement, which requires us to effect the registration of their shares in certain circumstances.

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The underwriter of this offering may waive or release parties to the lock-up agreement entered into in connection with this offering, which could adversely affect the price of our common stock.

We have entered into a lock-up agreement with respect to our common stock, pursuant to which we are subject to certain issuance and sale restrictions for a period of 45 days following the date of this prospectus supplement. In addition, all of our directors and executive officers and certain of our stockholders have entered into lock-up agreements with respect to their shares of our common stock, pursuant to which they are subject to certain resale restrictions for a period of 60 days following the date of this prospectus supplement. Goldman, Sachs & Co., at any time and without notice, may release all or any portion of the common stock subject to the foregoing lock-up agreement. If the restrictions under the lock-up agreement are waived, then the common stock, subject to compliance with the Securities Act or exceptions therefrom, will be available for sale into the public markets, which could cause the market price of our common stock to decline and impair our ability to raise capital.

We may issue preferred stock whose terms could adversely affect the voting power or value of our common stock.

Our amended and restated certificate of incorporation authorizes us to issue, without the approval of our stockholders, one or more classes or series of preferred stock having such designations, preferences, limitations and relative rights, including preferences over our common stock respecting dividends and distributions, as our board of directors may determine. The terms of one or more classes or series of preferred stock could adversely impact the voting power or value of our common stock. For example, we might grant holders of preferred stock the right to elect some number of our directors in all events or on the happening of specified events or the right to veto specified transactions. Similarly, the repurchase or redemption rights or liquidation preferences we might assign to holders of preferred stock could affect the residual value of the common stock.

The requirements of being a public company, including compliance with the reporting requirements of the Exchange Act and the requirements of the Sarbanes-Oxley Act of 2002, may strain our resources, increase our costs and distract management.

We completed our initial public offering in January 2014. As a public company, we incur significant legal, accounting and other expenses that we did not incur as a private company. We also incur costs associated with our public company reporting requirements and with corporate governance requirements, including requirements under the Sarbanes-Oxley Act of 2002, as well as rules implemented by the SEC and the Financial Industry Regulatory Authority. These rules and regulations will increase our legal and financial compliance costs and make some activities more time-consuming and costly, and we expect that these costs may increase further after we are no longer an "emerging growth company". These rules and regulations make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors or as executive officers.

However, for as long as we remain an "emerging growth company" as defined in the Jumpstart Our Business Startups Act (the "JOBS Act"), we intend to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies. See " For as long as we are an emerging growth company, we will not be required to comply with certain reporting requirements, including those relating to accounting standards and disclosure about our executive compensation, that apply to other public companies". We will remain an emerging growth company for up to five years, although we will

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lose that status sooner if we have more than \$1.0 billion of revenues in a fiscal year, become a large accelerated filer, or issue more than \$1.0 billion of non-convertible debt over a three-year period. After we are no longer an emerging growth company, we expect to incur significant additional expenses and devote substantial management effort toward ensuring compliance with those requirements applicable to companies that are not emerging growth companies.

If we fail to develop or maintain an effective system of internal controls, we may not be able to accurately report our financial results or prevent fraud. As a result, current and potential stockholders could lose confidence in our financial reporting, which would harm our business and the trading price of our common stock.

Effective internal controls are necessary for us to provide reliable financial reports, prevent fraud and operate successfully as a public company. If we cannot provide reliable financial reports or prevent fraud, our reputation and operating results would be harmed. We cannot be certain that our efforts to develop and maintain our internal controls will be successful, that we will be able to maintain adequate controls over our financial processes and reporting in the future or that we will be able to comply with our obligations under Section 404 of the Sarbanes Oxley Act of 2002. Any failure to develop or maintain effective internal controls, or difficulties encountered in implementing or improving our internal controls, could harm our operating results or cause us to fail to meet our reporting obligations. Ineffective internal controls could also cause investors to lose confidence in our reported financial information, which would likely have a negative effect on the trading price of our common stock.

For as long as we are an emerging growth company, we will not be required to comply with certain reporting requirements, including those relating to accounting standards and disclosure about our executive compensation, that apply to other public companies.

In April 2012, President Obama signed into law the JOBS Act. We are classified as an "emerging growth company" under the JOBS Act. For as long as we are an emerging growth company, which may be up to five full fiscal years, unlike other public companies, we will not be required to, among other things: (i) provide an auditor's attestation report on management's assessment of the effectiveness of our system of internal control over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002; (ii) comply with any new requirements adopted by the Public Company Accounting Oversight Board requiring mandatory audit firm rotation or a supplement to the auditor's report in which the auditor would be required to provide additional information about the audit and the financial statements of the issuer; (iii) provide certain disclosure regarding executive compensation required of larger public companies; or (iv) hold nonbinding advisory votes on executive compensation. We will remain an emerging growth company for up to five years, although we will lose that status sooner if we have more than \$1.0 billion of revenues in a fiscal year, become a large accelerated filer, or issue more than \$1.0 billion of non-convertible debt over a three-year period. To the extent that we rely on any of the exemptions available to emerging growth companies, you will receive less information about our executive compensation and internal control over financial reporting than issuers that are not emerging growth companies. If some investors find our common stock to be less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

If securities or industry analysts do not publish research or reports about our business, if they adversely change their recommendations regarding our common stock or if our operating results do not meet their expectations, our stock price could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. If one or more of these analysts

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cease coverage of our company or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline. Moreover, if one or more of the analysts who cover our company downgrades our common stock or if our operating results do not meet their expectations, our stock price could decline.

The value of our proved reserves as of December 31, 2014 calculated using SEC pricing may be higher than the fair market value of our proved reserves calculated using current market prices.

Our estimated proved reserves as of December 31, 2014 and related PV-10 and Standardized Measure were calculated under SEC rules using twelve-month trailing average benchmark prices of \$94.99 per barrel of oil (WTI) and \$4.35 per MMBtu (Henry Hub spot). On October 5, 2015, the prompt month NYMEX-WTI futures price for crude oil was \$46.26 per Bbl and the prompt month NYMEX-Henry Hub futures price of natural gas was \$2.45 per MMBtu. Using more recent prices in estimating our proved reserves, without giving effect to any acquisitions or development activities we have executed during 2015, would likely result in a reduction in proved reserve volumes due to economic limits, which would reduce the PV-10 and Standardized Measure of our proved reserves.

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USE OF PROCEEDS

We estimate that, after deducting underwriting discounts and commissions and estimated offering expenses payable by us, we will receive approximately \$ million of net proceeds from this offering, or \$ million if the underwriter exercises its option to purchase additional shares in full.

We intend to use the net proceeds from this offering first to fund a portion of the purchase price of the Possible Acquisition, if consummated, and the balance for general corporate purposes, which may include funding our drilling and development program. The Possible Acquisition is subject to the approval of the disinterested members of our board of directors, the receipt of a fairness opinion from an investment banking advisory firm and the satisfaction of other customary closing conditions. There can be no assurances that such approval, opinion or these conditions will be satisfied, that an agreement for the Possible Acquisition will be reached on the terms described herein or at all, or that the Possible Acquisition will be consummated. This offering is not conditioned on the consummation of the Possible Acquisition.

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Table of Contents**CAPITALIZATION**

The following table sets forth our cash and cash equivalents and capitalization as of June 30, 2015:

on an actual basis;

on a pro forma basis to give effect to (i) our issuance and sale of 8,050,000 shares of our common stock in an underwritten offering on August 7, 2015 and (ii) our issuance of \$200.0 million of our 6.625% senior notes due 2022 on August 10, 2015; and

on a pro forma basis as described above as adjusted to give effect to this offering as if it had occurred on June 30, 2015, assuming no exercise of the underwriter's option to purchase additional shares.

This table should be read in conjunction with, and is qualified in its entirety by reference to, "Use of Proceeds" in this prospectus supplement and "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the financial statements and the related notes in the Form 10-K and any subsequent Quarterly Report on Form 10-Q, which are incorporated by reference in this prospectus supplement.

	June 30, 2015		
	Actual	Pro Forma	Pro Forma
	(In thousands, except		
	number of shares and par value)		
Cash and cash equivalents	\$ 44,055	\$ 144,265	\$
Long-term debt, including current maturities:			
Revolving credit facility			
6.625% senior notes due 2022	500,000	700,000	700,000
Total indebtedness	\$ 500,000	\$ 700,000	\$ 700,000
Stockholders' equity:			
Preferred stock \$0.01 par value; 15,000,000 shares authorized, no shares issued or outstanding			
Common stock \$0.01 par value; 300,000,000 shares authorized, 84,020,222 shares issued and outstanding, actual; 300,000,000 shares authorized, 92,070,222 shares issued and outstanding, pro forma; and 300,000,000 shares authorized, 98,070,222 shares issued and outstanding, pro forma as adjusted	840	921	
Additional paid-in capital	1,472,239	1,650,468	
Retained earnings	(3,980)	(3,980)	
Total stockholders' equity	1,469,099	1,647,409	
Total capitalization	\$ 1,969,099	\$ 2,347,409	\$

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DIVIDEND POLICY

RSP Permian, Inc. has never declared and paid, and it does not anticipate declaring or paying, any cash dividends to holders of its common stock in the foreseeable future. We currently intend to retain future earnings, if any, for the development and growth of our business. Our future dividend policy is within the discretion of our board of directors and will depend upon then existing conditions, including our results of operations, financial condition, capital requirements, investment opportunities, statutory restrictions on our ability to pay dividends and other factors our board of directors may deem relevant. In addition, our revolving credit facility and the indenture governing our outstanding senior notes place restrictions on our ability to pay cash dividends.

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Table of Contents**MARKET PRICE OF OUR COMMON STOCK**

Our common stock began trading on the New York Stock Exchange (the "NYSE") under the symbol "RSPP" on January 17, 2014. Prior to that, there was no public market for our common stock. The table below sets forth, for the periods indicated, the high and low sales prices per share of our common stock since January 17, 2014.

	High	Low
2014		
First Quarter(1)	\$ 30.34	\$ 19.50
Second Quarter	\$ 33.67	\$ 25.73
Third Quarter	\$ 32.94	\$ 23.77
Fourth Quarter	\$ 30.06	\$ 19.36
2015		
First Quarter	\$ 29.88	\$ 21.62
Second Quarter	\$ 31.15	\$ 25.13
Third Quarter	\$ 28.28	\$ 19.20
Fourth Quarter (through October 5, 2015)	\$ 24.83	\$ 20.52

(1)

For the period from January 17, 2014 through March 31, 2014.

On October 5, 2015, the closing price of our common stock was \$24.66 per share. As of October 5, 2015, we had approximately 16 holders of record of our common stock. This number excludes owners for whom common stock may be held in "street" name.

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MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS FOR NON-U.S. HOLDERS

The following is a summary of the material U.S. federal income tax considerations related to the purchase, ownership and disposition of our common stock by a non-U.S. holder (as defined below) that holds our common stock as a "capital asset" (generally property held for investment). This summary is based on the provisions of the Internal Revenue Code of 1986, as amended (the "Code"), U.S. Treasury regulations and administrative rulings and judicial decisions, all as in effect on the date hereof, and all of which are subject to change, possibly with retroactive effect. We have not sought any ruling from the Internal Revenue Service ("IRS") with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS or a court will agree with such statements and conclusions.

This summary does not address all aspects of U.S. federal income taxation that may be relevant to non-U.S. holders in light of their personal circumstances. In addition, this summary does not address the Medicare tax on certain investment income, U.S. federal estate or gift tax laws, any state, local or non-U.S. tax laws or any tax treaties. This summary also does not address tax considerations applicable to investors that may be subject to special treatment under the U.S. federal income tax laws, such as (without limitation):

banks, insurance companies or other financial institutions;

tax-exempt or governmental organizations;

dealers in securities or foreign currencies;

traders in securities that use the mark-to-market method of accounting for U.S. federal income tax purposes;

persons subject to the alternative minimum tax;

partnerships or other pass-through entities for U.S. federal income tax purposes or holders of interests therein;

persons deemed to sell our common stock under the constructive sale provisions of the Code;

persons that acquired our common stock through the exercise of employee stock options or otherwise as compensation or through a tax-qualified retirement plan;

certain former citizens or long-term residents of the United States;

real estate investment trusts or regulated investment companies; and

persons that hold our common stock as part of a straddle, appreciated financial position, synthetic security, hedge, conversion transaction or other integrated investment or risk reduction transaction.

PROSPECTIVE INVESTORS ARE ENCOURAGED TO CONSULT THEIR TAX ADVISORS WITH RESPECT TO THE APPLICATION OF THE U.S. FEDERAL INCOME TAX LAWS TO THEIR PARTICULAR SITUATION, AS WELL AS ANY TAX CONSEQUENCES OF THE PURCHASE, OWNERSHIP AND DISPOSITION OF OUR COMMON STOCK ARISING UNDER THE

U.S. FEDERAL GIFT OR ESTATE TAX LAWS OR UNDER THE LAWS OF ANY STATE, LOCAL, NON-U.S. OR OTHER TAXING JURISDICTION OR UNDER ANY APPLICABLE TAX TREATY.

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Non-U.S. Holder Defined

For purposes of this discussion, a "non-U.S. holder" is a beneficial owner of our common stock that is not for U.S. federal income tax purposes a partnership or any of the following:

an individual who is a citizen or resident of the United States;

a corporation (or other entity treated as a corporation for U.S. federal income tax purposes) created or organized in or under the laws of the United States, any state thereof or the District of Columbia;

an estate the income of which is subject to U.S. federal income tax regardless of its source; or

a trust (i) whose administration is subject to the primary supervision of a U.S. court and which has one or more United States persons who have the authority to control all substantial decisions of the trust or (ii) which has made a valid election under applicable U.S. Treasury regulations to be treated as a United States person.

If a partnership (including an entity or arrangement treated as a partnership for U.S. federal income tax purposes) holds our common stock, the tax treatment of a partner in the partnership generally will depend upon the status of the partner, the activities of the partnership and certain determinations made at the partner level. Accordingly, we urge partners in partnerships (including entities or arrangements treated as partnerships for U.S. federal income tax purposes) considering the purchase of our common stock to consult their tax advisors regarding the U.S. federal income tax considerations of the purchase, ownership and disposition of our common stock by such partnership.

Distributions

As described in the section entitled "Dividend Policy", we do not currently make, and do not plan to make for the foreseeable future, any distributions on our common stock. However, if we do make distributions of cash or property on our common stock, those distributions will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. To the extent those distributions exceed our current and accumulated earnings and profits, the distributions will be treated as a non-taxable return of capital to the extent of the non-U.S. holder's tax basis in our common stock and thereafter as capital gain from the sale or exchange of such common stock. See "Gain on Disposition of Common Stock". Subject to the withholding requirements under FATCA (as defined below) and with respect to effectively connected dividends, each of which is discussed below, any distribution made to a non-U.S. holder on our common stock generally will be subject to U.S. withholding tax at a rate of 30% of the gross amount of the distribution unless an applicable income tax treaty provides for a lower rate. To receive the benefit of a reduced treaty rate, a non-U.S. holder must provide the applicable withholding agent with an IRS Form W-8BEN or IRS Form W-8BEN-E (or other applicable or successor form) certifying qualification for the reduced rate.

Dividends paid to a non-U.S. holder that are effectively connected with a trade or business conducted by the non-U.S. holder in the United States (and, if required by an applicable income tax treaty, are treated as attributable to a permanent establishment maintained by the non-U.S. holder in the United States) generally will be taxed on a net income basis at the rates and in the manner generally applicable to United States persons (as defined under the Code). Such effectively connected dividends will not be subject to U.S. withholding tax if the non-U.S. holder satisfies certain certification requirements by providing the applicable withholding agent a properly executed IRS Form W-8ECI certifying eligibility for exemption. If the non-U.S. holder is a corporation, it may also be subject to a branch profits tax (at a 30% rate or such lower rate as specified by an

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applicable income tax treaty) on its effectively connected earnings and profits (as adjusted for certain items).

Gain on Disposition of Common Stock

Subject to the discussion below under " Additional Withholding Requirements under FATCA", a non-U.S. holder generally will not be subject to U.S. federal income tax on any gain realized upon the sale or other disposition of our common stock unless:

the non-U.S. holder is an individual who is present in the United States for a period or periods aggregating 183 days or more during the calendar year in which the sale or disposition occurs and certain other conditions are met;

the gain is effectively connected with a trade or business conducted by the non-U.S. holder in the United States (and, if required by an applicable income tax treaty, is attributable to a permanent establishment maintained by the non-U.S. holder in the United States); or

our common stock constitutes a U.S. real property interest by reason of our status as a United States real property holding corporation ("USRPHC") for U.S. federal income tax purposes.

A non-U.S. holder described in the first bullet point above will be subject to U.S. federal income tax at a rate of 30% (or such lower rate as specified by an applicable income tax treaty) on the amount of such gain, which generally may be offset by U.S. source capital losses.

A non-U.S. holder whose gain is described in the second bullet point above or, subject to the exceptions described in the next paragraph, the third bullet point above generally will be taxed on a net income basis at the rates and in the manner generally applicable to United States persons (as defined under the Code) unless an applicable income tax treaty provides otherwise. If the non-U.S. holder is a corporation, it may also be subject to a branch profits tax (at a 30% rate or such lower rate as specified by an applicable income tax treaty) on its effectively connected earnings and profits (as adjusted for certain items) which will include such gain.

Generally, a corporation is a USRPHC if the fair market value of its U.S. real property interests equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests and its other assets used or held for use in a trade or business. We believe that we currently are, and expect to remain for the foreseeable future, a USRPHC for U.S. federal income tax purposes. However, as long as our common stock continues to be regularly traded on an established securities market, only a non-U.S. holder that actually or constructively owns or owned at any time during the shorter of the five-year period ending on the date of the disposition or the non-U.S. holder's holding period for the common stock, more than 5% of our common stock will be taxable on gain recognized on the disposition of our common stock as a result of our status as a USRPHC. If our common stock is not regularly traded on an established securities market at any time during the calendar year in which the relevant disposition by a non-U.S. holder occurs, then regardless of the percentage of our common stock held by such holder, such holder will be subject to U.S. federal income tax on a taxable disposition of our common stock (as described in the preceding paragraph), and a 10% U.S. withholding tax will apply to the gross proceeds from such disposition.

Non-U.S. holders should consult their tax advisors with respect to the application of the foregoing rules to their ownership and disposition of our common stock.

Backup Withholding and Information Reporting

Any dividends paid to a non-U.S. holder must be reported annually to the IRS and to the non-U.S. holder. Copies of these information returns may be made available to the tax authorities in

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the country in which the non-U.S. holder resides or is established. Payments of dividends to a non-U.S. holder generally will not be subject to backup withholding if the non-U.S. holder establishes an exemption by properly certifying its non-U.S. status on an IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate version of IRS Form W-8.

Payments of the proceeds from a sale or other disposition by a non-U.S. holder of our common stock effected by or through a U.S. office of a broker generally will be subject to information reporting and backup withholding (at the applicable rate) unless the non-U.S. holder establishes an exemption by properly certifying its non-U.S. status on an IRS Form W-8BEN, IRS Form W-8BEN-E or other appropriate version of IRS Form W-8 and certain other conditions are met. Information reporting and backup withholding generally will not apply to any payment of the proceeds from a sale or other disposition of our common stock effected outside the United States by a non-U.S. office of a broker. However, unless such broker has documentary evidence in its records that the holder is not a United States person and certain other conditions are met, or the non-U.S. holder otherwise establishes an exemption, information reporting will apply to a payment of the proceeds of the disposition of our common stock effected outside the United States by such a broker if it has certain relationships within the United States.

Backup withholding is not an additional tax. Rather, the U.S. income tax liability (if any) of persons subject to backup withholding will be reduced by the amount of tax withheld. If withholding results in an overpayment of taxes, a refund may be obtained, provided that the required information is timely furnished to the IRS.

Additional Withholding Requirements under FATCA

Sections 1471 through 1474 of the Code, and the Treasury regulations and administrative guidance issued thereunder ("FATCA"), impose a 30% withholding tax on any dividends paid on our common stock and on the gross proceeds from a disposition of our common stock (if such disposition occurs after December 31, 2018), in each case if paid to a "foreign financial institution" or a "non-financial foreign entity" (each as defined in the Code) (including, in some cases, when such foreign financial institution or non-financial foreign entity is acting as an intermediary), unless: (i) in the case of a foreign financial institution, such institution enters into an agreement with the U.S. government to withhold on certain payments, and to collect and provide to the U.S. tax authorities substantial information regarding U.S. account holders of such institution (which includes certain equity and debt holders of such institution, as well as certain account holders that are non-U.S. entities with U.S. owners); (ii) in the case of a non-financial foreign entity, such entity certifies that it does not have any "substantial United States owners" (as defined in the Code) or provides the applicable withholding agent with a certification (generally on an IRS Form W-8BEN-E) identifying the direct and indirect substantial United States owners of the entity; or (iii) the foreign financial institution or non-financial foreign entity otherwise qualifies for an exemption from these rules and provides appropriate documentation (such as an IRS Form W-8BEN-E). Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United States governing these rules may be subject to different rules. Under certain circumstances, a holder might be eligible for refunds or credits of such taxes.

THE FOREGOING DISCUSSION IS FOR GENERAL INFORMATION ONLY AND SHOULD NOT BE VIEWED AS TAX ADVICE. INVESTORS CONSIDERING THE PURCHASE OF OUR COMMON STOCK ARE URGED TO CONSULT THEIR OWN TAX ADVISORS REGARDING THE APPLICATION OF THE U.S. FEDERAL INCOME TAX LAWS TO THEIR PARTICULAR SITUATIONS AND THE APPLICABILITY AND EFFECT OF U.S. FEDERAL GIFT OR ESTATE TAX LAWS AND ANY STATE, LOCAL OR NON-U.S. TAX LAWS AND TAX TREATIES.

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UNDERWRITING

Under the terms of an underwriting agreement, which we will file as an exhibit to a Current Report on Form 8-K and which will be incorporated by reference into this prospectus supplement and the accompanying prospectus, Goldman, Sachs & Co. has agreed to purchase from the Company the number of shares of common stock shown opposite its name below:

Underwriter	Number of Shares
Goldman, Sachs & Co.	

Total

The underwriting agreement provides that the underwriter's obligation to purchase shares of common stock depends on the satisfaction of the conditions contained in the underwriting agreement, including:

the obligation to purchase all of the shares of common stock offered hereby (other than those shares of common stock covered by their option to purchase additional shares as described below), if any of the shares are purchased;

the representations and warranties made by us to the underwriter are true;

there is no material change in our business or the financial markets; and

our delivery of customary closing documents to the underwriter.

Commissions and Expenses

The following table summarizes the underwriting discounts and commissions that we will pay to the underwriter. These amounts are shown assuming both no exercise and full exercise of the underwriter's option to purchase additional shares. The underwriting fee is the difference between the initial price to the public and the amount the underwriter pays to us for the shares.

	No Exercise	Full Exercise
Per Share	\$	\$
Total (in thousands)	\$	\$

Goldman, Sachs & Co. has advised us that it proposes to offer the shares of common stock directly to the public at the public offering price on the cover of this prospectus supplement and to selected dealers at such offering price less a selling concession not in excess of \$ per share. After this offering, Goldman, Sachs & Co. may change the offering price and other selling terms. Sales of the shares of common stock made outside of the United States may be made by affiliates of the underwriter. The offering of the shares by the underwriter is subject to receipt and acceptance and subject to the underwriter's right to reject any order in whole or in part.

The expenses of this offering that are payable by us are estimated to be approximately \$ million (excluding underwriting discounts and commissions). We have agreed to reimburse the underwriter for certain of its expenses in an amount up to \$20,000.

Option to Purchase Additional Shares

We have granted the underwriter an option exercisable for 30 days after the date of this prospectus to purchase, from time to time, in whole or in part, up to an aggregate of 900,000 additional shares at the public offering price less underwriting discounts and commissions.

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Lock-Up Agreements

We, all of our directors and executive officers and certain of our stockholders have agreed or will agree that, for a period of 45 days after the date of this prospectus, we and they will not directly or indirectly, without the prior written consent of Goldman, Sachs & Co., (i) offer for sale, sell, pledge or otherwise dispose of (or enter into any transaction or device that is designed to, or could be expected to, result in the disposition by any person at any time in the future of) any shares of our common stock (including, without limitation, shares of our common stock that may be deemed to be beneficially owned by us or them in accordance with the rules and regulations of the SEC and shares of our common stock that may be issued upon exercise of any options or warrants) or securities convertible into or exercisable or exchangeable for shares of our common stock (other than the stock and shares issued pursuant to employee benefit plans, qualified stock option plans or other employee compensation plans existing on the date of this prospectus or pursuant to currently outstanding options, warrants or rights not issued under one of those plans), or sell or grant options, rights or warrants with respect to any shares of our common stock or securities convertible into or exchangeable for shares of our common stock (other than the grant of options pursuant to option plans existing on the date of this prospectus); (ii) enter into any swap or other derivatives transaction that transfers to another, in whole or in part, any of the economic benefits or risks of ownership of shares of our common stock, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of common stock or other securities, in cash or otherwise; (iii) make any demand for or exercise any right or file or cause to be filed a registration statement, including any amendments thereto, with respect to the registration of any shares of our common stock or securities convertible, exercisable or exchangeable into shares of our common stock or any of our other securities (other than any registration statement on Form S-8); or (iv) publicly disclose the intention to do any of the foregoing provided that (1) the restrictions described in clauses (i) and (iv) of this paragraph shall not apply to issuances of common stock directly to a seller of a business or assets as part of the purchase price or private placements in connection with acquisitions thereof by us; provided, further, that (x) any such recipient of such shares of common stock will agree to be bound by these restrictions for the remainder of such 45-day period and (y) the aggregate number of shares of common stock that we may offer pursuant to the foregoing proviso shall not exceed 10% of the total number of shares of our common stock issued and outstanding immediately following the completion of the offering contemplated by this prospectus; and (2) in the case of our directors and executive officers, certain of our stockholders and the selling stockholders, the restrictions described in clause (i) of this paragraph shall not apply to (a) transactions relating to shares of common stock or other securities acquired in the open market after the completion of the offering, (b) bona fide gifts, sales or other dispositions of shares of any class of our capital stock, in each case that are made exclusively between and among such persons or members of such persons' family, or affiliates of such persons, (c) the establishment of any contract, instruction or plan that satisfies all of the requirements of Rule 10b5-1 (a "Rule 10b5-1 Plan") under the Exchange Act, (d) sales of shares of common stock under a Rule 10b5-1 Plan currently in effect on the date of this prospectus, or (e) the sale, together with sales by other officers and directors of the company signing substantially similar agreements, of up to 200,000 shares of common stock in the aggregate, as allocated by us (exclusive of sales pursuant to clause (d) above).

Goldman, Sachs & Co., in its sole discretion, may release the shares of our common stock and other securities subject to the lock-up agreements described above in whole or in part at any time. When determining whether or not to release shares of our common stock and other securities from lock-up agreements, Goldman, Sachs & Co. will consider, among other factors, the holder's reasons for requesting the release, the number of shares of common stock and other securities for which the release is being requested and market conditions at the time.

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Indemnification

We have agreed to indemnify the underwriter against certain liabilities, including liabilities under the Securities Act, and to contribute to payments that the underwriter may be required to make for these liabilities.

Stabilization, Short Positions and Penalty Bids

The underwriter may engage in stabilizing transactions, short sales and purchases to cover positions created by short sales and penalty bids or purchases for the purpose of pegging, fixing or maintaining the price of our common stock, in accordance with Regulation M under the Exchange Act:

Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum.

A short position involves a sale by the underwriter of shares in excess of the number of shares the underwriter is obligated to purchase in this offering, which creates the syndicate short position. This short position may be either a covered short position or a naked short position. In a covered short position, the number of shares involved in the sales made by the underwriter in excess of the number of shares is obligated to purchase is not greater than the number of shares that it may purchase by exercising its option to purchase additional shares. In a naked short position, the number of shares involved is greater than the number of shares in the option to purchase additional shares. The underwriter may close out any short position by either exercising its option to purchase additional shares and/or purchasing shares in the open market. In determining the source of shares to close out the short position, the underwriter will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the option to purchase additional shares. A naked short position is more likely to be created if the underwriter is concerned that there could be downward pressure on the price of the shares in the open market after pricing that could adversely affect investors who purchase in this offering.

Syndicate covering transactions involve purchases of the common stock in the open market after the distribution has been completed in order to cover syndicate short positions.

Penalty bids permit the underwriter to reclaim a selling concession from a syndicate member when the common stock originally sold by the syndicate member is purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These stabilizing transactions, syndicate covering transactions and penalty bids may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of the common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. These transactions may be effected on the NYSE or otherwise and, if commenced, may be discontinued at any time.

Neither we nor the underwriter make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of our common stock. In addition, neither we nor the underwriter make any representation that the underwriter will engage in these stabilizing transactions or that any transaction, once commenced, will not be discontinued without notice.

Listing on the New York Stock Exchange

Our common stock is listed on the NYSE under the symbol "RSPP".

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Stamp Taxes

If you purchase shares of common stock offered in this prospectus, you may be required to pay stamp taxes and other charges under the laws and practices of the country of purchase, in addition to the offering price.

Other Relationships

The underwriter and certain of its affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. The underwriter and certain of its affiliates have, from time to time, performed, and may in the future perform, various commercial and investment banking and financial advisory services for us and our affiliates, for which they received or may in the future receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriter and certain of its affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities), currencies, commodities, credit default swaps and other financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments of ours or our affiliates. The underwriter and certain of its affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

Electronic Distribution

A prospectus in electronic format may be made available on the Internet sites or through other online services maintained by the underwriter and/or selling group members participating in this offering, or by their affiliates. In those cases, prospective investors may view offering terms online and, depending upon the underwriter or selling group member, prospective investors may be allowed to place orders online. The underwriter may agree with us to allocate a specific number of shares for sale to online brokerage account holders. Any such allocation for online distributions will be made by the underwriter on the same basis as other allocations. Other than the prospectus in electronic format, the information on the underwriter's or selling group member's web site and any information contained in any other web site maintained by the underwriter or selling group member is not part of the prospectus or the registration statement of which this prospectus forms a part, has not been approved and/or endorsed by us or the underwriter or selling group member in its capacity as underwriter or selling group member and should not be relied upon by investors.

Selling Restrictions

This prospectus does not constitute an offer to sell to, or a solicitation of an offer to buy from, anyone in any country or jurisdiction (i) in which such an offer or solicitation is not authorized; (ii) in which any person making such offer or solicitation is not qualified to do so; or (iii) in which any such offer or solicitation would otherwise be unlawful. No action has been taken that would, or is intended to, permit a public offer of the shares of our common stock or possession or distribution of this prospectus or any other offering or publicity material relating to the shares of our common stock in any country or jurisdiction (other than the United States) where any such action for that purpose is required. Accordingly, the underwriter has undertaken that it will not, directly or indirectly, offer or sell any shares of our common stock or have in its possession, distribute or

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publish any prospectus, form of application, advertisement or other document or information in any country or jurisdiction except under circumstances that will, to the best of its knowledge and belief, result in compliance with any applicable laws and regulations and all offers and sales of shares of our common stock by it will be made on the same terms.

European Economic Area

In relation to each Member State of the European Economic Area which has implemented the Prospectus Directive (each, a Relevant Member State), the underwriter has represented and agreed that with effect from and including the date on which the Prospectus Directive is implemented in that Relevant Member State (the Relevant Implementation Date) it has not made and will not make an offer of shares to the public in that Relevant Member State prior to the publication of a prospectus in relation to the shares which has been approved by the competent authority in that Relevant Member State or, where appropriate, approved in another Relevant Member State and notified to the competent authority in that Relevant Member State, all in accordance with the Prospectus Directive, except that it may, with effect from and including the Relevant Implementation Date, make an offer of shares to the public in that Relevant Member State at any time:

to legal entities which are authorised or regulated to operate in the financial markets or, if not so authorised or regulated, whose corporate purpose is solely to invest in securities;

to any legal entity which has two or more of (1) an average of at least 250 employees during the last financial year; (2) a total balance sheet of more than €43,000,000 and (3) an annual net turnover of more than €50,000,000, as shown in its last annual or consolidated accounts;

to fewer than 100 natural or legal persons (other than qualified investors as defined in the Prospectus Directive) subject to obtaining the prior consent of the underwriter for any such offer; or

in any other circumstances which do not require the publication by the Issuer of a prospectus pursuant to Article 3 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer of shares to the public" in relation to any shares in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the shares to be offered so as to enable an investor to decide to purchase or subscribe for the shares, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State and the expression Prospectus Directive means Directive 2003/71/EC and includes any relevant implementing measure in each Relevant Member State.

United Kingdom

The underwriter has represented and agreed that:

it has only communicated or caused to be communicated and will only communicate or cause to be communicated an invitation or inducement to engage in investment activity (within the meaning of Section 21 of the Financial Services and Markets Act 2000 (the "FSMA")) received by it in connection with the issue or sale of the shares in circumstances in which Section 21(1) of the FSMA does not apply to the Issuer; and

it has complied and will comply with all applicable provisions of the FSMA with respect to anything done by it in relation to the shares in, from or otherwise involving the United Kingdom.

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Hong Kong

The shares may not be offered or sold by means of any document other than (i) in circumstances which do not constitute an offer to the public within the meaning of the Companies Ordinance (Cap. 32, Laws of Hong Kong), (ii) to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a "prospectus" within the meaning of the Companies Ordinance (Cap. 32, Laws of Hong Kong), and no advertisement, invitation or document relating to the shares may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder.

Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore (the "SFA"), (ii) to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the shares are subscribed or purchased under Section 275 by a relevant person which is: (a) a corporation (which is not an accredited investor) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or (b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary is an accredited investor, shares, debentures and units of shares and debentures of that corporation or the beneficiaries' rights and interest in that trust shall not be transferable for 6 months after that corporation or that trust has acquired the shares under Section 275 except: (1) to an institutional investor under Section 274 of the SFA or to a relevant person, or any person pursuant to Section 275(1A), and in accordance with the conditions, specified in Section 275 of the SFA; (2) where no consideration is given for the transfer; or (3) by operation of law.

Japan

The securities have not been and will not be registered under the Financial Instruments and Exchange Act of Japan (Act No. 25 of 1948, as amended), or the FIEA. The securities may not be offered or sold, directly or indirectly, in Japan or to or for the benefit of any resident of Japan (including any person resident in Japan or any corporation or other entity organized under the laws of Japan) or to others for reoffering or resale, directly or indirectly, in Japan or to or for the benefit of any resident of Japan, except pursuant to an exemption from the registration requirements of the FIEA and otherwise in compliance with any relevant laws and regulations of Japan.

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Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus supplement (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 Underwriting Conflicts (NI 33-105), Goldman, Sachs & Co. is not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

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LEGAL MATTERS

The validity of the shares of our common stock being offered by this prospectus supplement and the accompanying prospectus will be passed upon for us by Vinson & Elkins L.L.P., Houston, Texas. Certain legal matters will be passed upon for the underwriter by Latham & Watkins LLP, Houston, Texas.

EXPERTS

The audited financial statements of RSP Permian, Inc. incorporated by reference in this prospectus and elsewhere in the registration statement have been so incorporated by reference in reliance upon the report of Grant Thornton LLP, independent registered public accountants, upon the authority of said firm as experts in accounting and auditing.

Estimates of our oil and natural gas reserves and related future net cash flows related to our properties as of December 31, 2014 incorporated by reference in this prospectus and elsewhere in the registration statement were based upon reserve reports prepared by independent petroleum engineers, Netherland, Sewell & Associates, Inc. We have included these estimates in reliance on the authority of such firm as an expert in such matters.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We file annual, quarterly current and other reports and other information with the SEC. You may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Room 1580, Washington, D.C., 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room. Our SEC filings are also available to the public from commercial document retrieval services and through the SEC's website at <http://www.sec.gov>.

Our common stock is listed on the NYSE under the symbol "RSPP". Our reports and other information filed with the SEC can also be inspected at the offices of the NYSE, 20 Broad Street, New York, New York 10005.

We also make available free of charge on our Internet website at www.rsppermian.com all of the documents that we file with the SEC as soon as reasonably practicable after we electronically file those documents with the SEC. Information contained on our website is not incorporated by reference into this prospectus supplement, and you should not consider information contained on our website as part of this prospectus supplement.

INCORPORATION BY REFERENCE

We "incorporate by reference" information from other documents that we file with the SEC into this prospectus supplement, which means that we disclose important information to you by referring you to those documents. The information incorporated by reference is deemed to be part of this prospectus supplement. You should not assume that the information in this prospectus supplement is current as of the date other than the date on the cover page of this prospectus supplement.

We incorporate by reference in this prospectus supplement the documents listed below and any subsequent filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (excluding information deemed to be furnished and not filed with the SEC) after the date of this prospectus supplement and before the filing of a post-effective amendment to the

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registration statement of which this prospectus supplement is a part that indicates that all securities offered hereunder have been sold or that deregisters all securities then remaining unsold:

The description of our common stock contained in our Registration Statement on Form 8-A, as filed with the SEC on January 14, 2014, including any amendment to that form that we may file in the future for the purpose of updating the description of our common stock;

Our Annual Report on Form 10-K for the year ended December 31, 2014, as filed with the SEC on March 17, 2015;

Our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2015 and June 30, 2015 as filed with the SEC on May 12, 2015 and August 3, 2015.

Our Current Reports on Form 8-K as filed with the SEC on March 17, 2015, March 23, 2015, April 10, 2015, May 27, 2015, August 5, 2015, August 6, 2015, August 7, 2015, August 12, 2015, August 25, 2015 and October 7, 2015 (in each case, excluding any information furnished pursuant to Item 2.02 or Item 7.01 of any such Current Report on Form 8-K).

The most recent information that we file with the SEC automatically updates and supersedes more dated information.

You may request a copy of any document incorporated by reference in this prospectus supplement and any exhibit specifically incorporated by reference in those documents, at no cost, by writing or telephoning us at the following address or phone number:

RSP Permian, Inc.
3141 Hood Street, Suite 500
Dallas, Texas 75219
Attention: Investor Relations
Telephone: (214) 252-2700

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PROSPECTUS

RSP Permian, Inc.

Common Stock

By this prospectus, we may offer and sell, from time to time in one or more offerings, our common stock at prices and on terms that will be determined at the time of any such offerings. This prospectus may also be used by the selling stockholders named in this prospectus in connection with resales, from time to time in one or more offerings, of up to 4,600,000 shares of our common stock held by such selling stockholders at prices and on terms that will be determined at the time of any such offerings. We refer to our common stock that may be offered by us or the selling stockholders pursuant to this prospectus and any applicable prospectus supplement collectively as the "securities."

We will not receive any proceeds from the sale of shares of common stock to be offered by the selling stockholders. However, we will pay the expenses, other than underwriting discounts and commissions, associated with the sale of shares by the selling stockholders.

This prospectus describes some of the general terms that may apply to our common stock. Each time any common stock is offered pursuant to this prospectus, we will provide a prospectus supplement containing more specific information about the offering, including the number of shares of our common stock to be sold by us and/or the selling stockholders. The prospectus supplement may also add, update or change information contained in this prospectus. We may also authorize one or more free writing prospectuses to be provided to you in connection with these offerings. You should read this prospectus, the applicable prospectus supplement and any related free writing prospectus, as well as the documents incorporated by reference herein or therein, carefully before you make your investment decision.

The shares of our common stock may be sold at a fixed price or prices, which may be changed, at market prices prevailing at the time of sale, at prices related to such prevailing market prices or at a negotiated price. The shares of our common stock offered by this prospectus and any accompanying prospectus supplement may be offered by us or the selling stockholders directly to purchasers or to or through underwriters, brokers or dealers or other agents. The prospectus supplement for each offering will describe in detail the plan of distribution for that offering and will set forth the names of any underwriters, brokers or dealers or agents involved in the offering and any applicable fees, commissions or discounts.

Our common stock is listed on the New York Stock Exchange under the symbol "RSPP."

Investing in our common stock involves risks. See "Risk Factors" on page 2 of this prospectus, as well as those contained in the accompanying prospectus supplement and the documents incorporated by reference herein or therein, for a discussion of factors you should consider before buying shares of our common stock.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the securities described herein or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

Prospectus dated March 17, 2015

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Neither we nor the selling stockholders have authorized anyone to provide any information or to make any representations other than those contained or incorporated by reference in this prospectus, any accompanying prospectus supplement or any free writing prospectus we have prepared. We take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. This prospectus is an offer to sell only the shares of common stock offered hereby and only under circumstances and in jurisdictions where it is lawful to do so. The information contained or incorporated by reference in this prospectus is current only as of its date.

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ABOUT THIS PROSPECTUS

This prospectus is part of an automatic shelf registration statement that we filed with the Securities and Exchange Commission (the "SEC") as a "well-known seasoned issuer" as defined in Rule 405 under the Securities Act of 1933, as amended (the "Securities Act"). Under the automatic shelf registration process, we and the selling stockholders named herein may offer and sell, from time to time, shares of our common stock.

This prospectus provides you with a general description of the common stock that we or any selling stockholder named herein may offer. Each time we or any selling stockholder offer to sell common stock, we will provide a prospectus supplement that will contain specific information about the terms of that offering. The prospectus supplement that accompanies this prospectus may describe, as applicable: the public offering price, the price paid for the securities, the net proceeds and the other specific terms related to the offering of these securities. We may also authorize one or more free writing prospectuses to be provided to you that may contain material information relating to these offerings. The prospectus supplement and any related free writing prospectus may also add to, update or change information contained in this prospectus or in any documents that we have incorporated by reference into this prospectus and, accordingly, to the extent inconsistent, information in this prospectus is superseded by the information in the prospectus supplement or any related free writing prospectus.

This prospectus does not contain all of the information included in the registration statement. The registration statement filed with the SEC includes or incorporates by reference exhibits that provide more details about the matters discussed in this prospectus. You should carefully read this prospectus, the related exhibits filed with the SEC and any prospectus supplement, together with the additional information described below under the headings "Where You Can Find Additional Information" and "Incorporation of Documents by Reference."

No offer of these securities will be made in any jurisdiction where the offer is not permitted.

As used in this prospectus, unless the context otherwise requires, references to the "Company," "RSP," "we," "us" and "our" refer to RSP Permian, Inc. and, where appropriate, its subsidiary, RSP Permian, L.L.C.

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CAUTIONARY STATEMENT REGARDING FORWARD-LOOKING STATEMENTS

The information in this prospectus, including in the documents incorporated by reference herein, includes forward-looking statements within the meaning of Section 27A of the Securities Act, Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the Private Securities Litigation Reform Act of 1995. All statements, other than statements of historical fact contained in this prospectus and the documents incorporated by reference into it, regarding our strategy, future operations, financial position, estimated revenues and losses, projected costs, prospects, plans and objectives of management are forward-looking statements. When used, the words "could," "believe," "anticipate," "intend," "estimate," "expect," "project" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain such identifying words. These forward-looking statements are based on management's current expectations and assumptions about future events and are based on currently available information as to the outcome and timing of future events. When considering forward-looking statements, you should keep in mind the risk factors and other cautionary statements described under "Risk Factors" in this prospectus, the accompanying prospectus supplement, our most recent Annual Report on Form 10-K (the "Form 10-K"), any subsequent Quarterly Report on Form 10-Q and any Current Report on Form 8-K incorporated by reference herein. Should one or more of these risks or uncertainties occur, or should underlying assumptions prove incorrect, our actual results and plans could differ materially from those expressed in any forward looking statements.

Forward-looking statements may include statements about:

our business strategy;

our reserves;

our exploration and development drilling prospects, inventories, projects and programs;

our ability to replace the reserves we produce through drilling and property acquisitions;

our financial strategy, liquidity and capital required for our development program;

our realized oil, natural gas liquid ("NGL") and natural gas prices;

the timing and amount of future production of oil, NGLs and natural gas;

our hedging strategy and results;

our future drilling plans;

our competition and government regulations;

our ability to obtain permits and governmental approvals;

our pending legal or environmental matters;

our marketing of oil, NGLs and natural gas;

our leasehold or business acquisitions;

costs of developing our properties;

general economic conditions;

credit markets;

uncertainty regarding our future operating results; and

our plans, objectives, expectations and intentions that are not historical.

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We caution you that these forward-looking statements are subject to all of the risks and uncertainties, most of which are difficult to predict and many of which are beyond our control, incident to the exploration for and development, production, gathering and sale of oil, NGLs and natural gas. These risks include, but are not limited to, commodity price volatility, inflation, lack of availability of drilling and production equipment and services, environmental risks, drilling and other operating risks, regulatory changes, the uncertainty inherent in estimating reserves and in projecting future rates of production, cash flow and access to capital, the timing of development expenditures and the other risks described under "Risk Factors" in this prospectus, the accompanying prospectus supplement, the Form 10-K, any subsequent Quarterly Report on Form 10-Q and any Current Report on Form 8-K incorporated by reference herein.

Reserve engineering is a process of estimating underground accumulations of oil, NGLs and natural gas that cannot be measured in an exact way. The accuracy of any reserve estimate depends on the quality of available data, the interpretation of such data and price and cost assumptions made by reserve engineers. In addition, the results of drilling, testing and production activities may justify revisions of estimates that were made previously. If significant, such revisions would change the schedule of any further production and development drilling. Accordingly, reserve estimates may differ significantly from the quantities of oil, NGLs and natural gas that are ultimately recovered.

All forward-looking statements, expressed or implied, attributable to us or persons acting on our behalf are expressly qualified in their entirety by this cautionary statement. This cautionary statement should also be considered in connection with any subsequent written or oral forward-looking statements that we or persons acting on our behalf may issue.

All forward-looking statements speak only as of the date they are made. Except as otherwise required by applicable law, we disclaim any duty to update any forward-looking statements, all of which are expressly qualified by the statements in this section, to reflect events or circumstances after the date of this prospectus.

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THE COMPANY

We are an independent oil and natural gas company focused on the acquisition, exploration, development and production of unconventional oil and associated liquids-rich natural gas reserves in the Permian Basin of West Texas. The vast majority of our acreage is located on large, contiguous acreage blocks in the core of the Midland Basin, a sub-basin of the Permian Basin, primarily in the adjacent counties of Midland, Martin, Andrews, Dawson, Ector and Glasscock. For more information about our business, operations and financial results, see the documents listed under "Where You Can Find Additional Information."

Corporate Information

Our principal executive offices are located at 3141 Hood Street, Suite 500, Dallas, Texas 75219, and our telephone number at that address is (214) 252-2700. Our website address is www.rsppermian.com. Our periodic reports and other information filed with or furnished to the SEC are available free of charge through our website as soon as reasonably practicable after those reports and other information are electronically filed with or furnished to the SEC. Except for information specifically incorporated by reference into this prospectus that may be accessed from our website, the information on, or otherwise accessible through, our website or any other website does not constitute a part of this prospectus.

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RISK FACTORS

Investing in our common stock involves a high degree of risk. Before deciding whether to purchase shares of our common stock, you should carefully consider the risks and uncertainties described under "Risk Factors" in the Form 10-K, any subsequent Quarterly Reports on Form 10-Q, any Current Report on Form 8-K incorporated by reference herein and the accompanying prospectus supplement, together with all of the other information included in, or incorporated by reference into, this prospectus and in the accompanying prospectus supplement. See "Incorporation by Reference." If any of these risks actually occur, our business, financial condition and results of operations could be materially and adversely affected and we may not be able to achieve our goals, the value of our securities could decline and you could lose some or all of your investment. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations.

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USE OF PROCEEDS

Unless the applicable prospectus supplement indicates otherwise, we intend to use the net proceeds from any sales of securities by us under this prospectus for general corporate purposes. We will not receive any proceeds from the sale of any securities by any selling stockholder named in this prospectus, unless otherwise indicated.

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DESCRIPTION OF CAPITAL STOCK

General

Our authorized capital stock consists of 300,000,000 shares of common stock, \$0.01 par value per share, of which 78,267,452 shares are issued and outstanding as of March 12, 2015 (including 1,041,766 shares of restricted stock that have been awarded to our directors and certain of our employees and consultants), and 15,000,000 shares of preferred stock, \$0.01 par value per share, of which no shares are issued and outstanding.

The following summary of our capital stock and our amended and restated certificate of incorporation and our amended and restated bylaws does not purport to be complete and is qualified in its entirety by reference to the provisions of applicable law and to our amended and restated certificate of incorporation and our amended and restated bylaws.

Common Stock

Except as provided by law or in a preferred stock designation, holders of common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders, have the exclusive right to vote for the election of directors and do not have cumulative voting rights. Except as otherwise required by law, holders of common stock are not entitled to vote on any amendment to the amended and restated certificate of incorporation (including any certificate of designations relating to any series of preferred stock) that relates solely to the terms of any outstanding series of preferred stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to our amended and restated certificate of incorporation (including any certificate of designations relating to any series of preferred stock) or pursuant to the General Corporation Law of the State of Delaware (the "DGCL"). Subject to prior rights and preferences that may be applicable to any outstanding shares or series of preferred stock, holders of common stock are entitled to receive ratably in proportion to the shares of common stock held by them such dividends (payable in cash, stock or otherwise), if any, as may be declared from time to time by our board of directors out of funds legally available for dividend payments. All outstanding shares of common stock are fully paid and non-assessable, and the shares of common stock to be issued upon completion of this offering will be fully paid and non-assessable.

The holders of common stock have no preferences or rights of conversion, exchange, preemption or other subscription rights. There are no redemption or sinking fund provisions applicable to our common stock. In the event of any voluntary or involuntary liquidation, dissolution or winding-up of our affairs, holders of common stock will be entitled to share ratably in our assets in proportion to the shares of common stock held by them that are remaining after payment or provision for payment of all of our debts and obligations and after distribution in full of preferential amounts to be distributed to holders of outstanding shares of preferred stock, if any.

Preferred Stock

Our amended and restated certificate of incorporation authorizes our board of directors, subject to any limitations prescribed by law, without further stockholder approval, to establish and to issue from time to time one or more classes or series of preferred stock, par value \$0.01 per share, covering up to an aggregate of 15,000,000 shares of preferred stock. Each class or series of preferred stock will cover the number of shares and will have the powers, preferences, rights, qualifications, limitations and restrictions determined by our board of directors, which may include, among others, dividend rights, liquidation preferences, voting rights, conversion rights, preemptive rights and redemption rights. Except as provided by law or in a preferred stock designation, the holders of preferred stock are not entitled to vote at or receive notice of any meeting of stockholders.

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Anti-Takeover Effects of Delaware Law, Our Amended and Restated Certificate of Incorporation and Our Amended and Restated Bylaws

Some provisions of Delaware law, our amended and restated certificate of incorporation and our amended and restated bylaws contain provisions that could make the following transactions more difficult: acquisitions of us by means of a tender offer, a proxy contest or otherwise or removal of our incumbent officers and directors. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions that might result in a premium over the market price for our shares.

These provisions are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with us. We believe that the benefits of increased protection and our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because, among other things, negotiation of these proposals could result in an improvement of their terms.

Delaware Law

Our amended and restated certificate of incorporation provides that we are not governed by Section 203 of the DGCL, which, in the absence of such provisions, would have imposed additional requirements regarding mergers and other business combinations. Section 203 of the DGCL prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder, unless:

the transaction is approved by the board of directors before the date the interested stockholder attained that status;

upon consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced; or

on or after such time the business combination is approved by the board of directors and authorized at a meeting of stockholders by at least two-thirds of the outstanding voting stock that is not owned by the interested stockholder.

An interested stockholder is defined as a person who, together with any affiliates or associates of such person, beneficially owns, directly or indirectly, 15% or more of the outstanding voting shares of a Delaware corporation. The term "business combination" is broadly defined to include a broad array of transactions, including mergers, consolidations, sales or other dispositions of assets having a total value in excess of 10% of the consolidated assets of the corporation or all of the outstanding stock of the corporation, and some other transactions that would increase the interested stockholder's proportionate share ownership in the corporation.

Our Amended and Restated Certificate of Incorporation and Our Amended and Restated Bylaws

Provisions of our amended and restated certificate of incorporation and our amended and restated bylaws may delay or discourage transactions involving an actual or potential change in control or change in our management, including transactions in which stockholders might otherwise receive a premium for their shares, or transactions that our stockholders might otherwise deem to be in their best interests. Therefore, these provisions could adversely affect the price of our common stock.

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Among other things, our amended and restated certificate of incorporation and amended and restated bylaws:

establish advance notice procedures with regard to stockholder proposals relating to the nomination of candidates for election as directors or new business to be brought before meetings of our stockholders. These procedures provide that notice of stockholder proposals must be timely given in writing to our corporate secretary prior to the meeting at which the action is to be taken. Generally, to be timely, notice must be received at our principal executive offices not less than 90 days nor more than 120 days prior to the first anniversary date of the annual meeting for the preceding year. Our amended and restated bylaws specify the requirements as to form and content of all stockholders' notices. These requirements may preclude stockholders from bringing matters before the stockholders at an annual or special meeting;

provide our board of directors the ability to authorize undesignated preferred stock. This ability makes it possible for our board of directors to issue, without stockholder approval, preferred stock with voting or other rights or preferences that could impede the success of any attempt to change control of us. These and other provisions may have the effect of deferring hostile takeovers or delaying changes in control or management of our company;

provide that the authorized number of directors may be changed only by resolution of our board of directors;

provide that all vacancies, including newly created directorships, may, except as otherwise required by law or, if applicable, the rights of holders of a series of preferred stock, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;

provide that any action required or permitted to be taken by the stockholders must be effected at a duly called annual or special meeting of stockholders and may not be effected by any consent in writing in lieu of a meeting of such stockholders, subject to the rights of the holders of any series of preferred stock with respect to such series;

provide that our certificate of incorporation and bylaws may be amended by the affirmative vote of the holders of at least two-thirds of our then outstanding common stock;

provide that special meetings of our stockholders may only be called by our board of directors, our chief executive officer or the chairman of our board of directors;

provide for our board of directors to be divided into three classes of directors, with each class as nearly equal in number as possible, serving staggered three year terms, other than directors which may be elected by holders of preferred stock, if any. This system of electing and removing directors may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us because it generally makes it more difficult for stockholders to replace a majority of the directors;

provide that we renounce any interest in existing and future investments in other entities by, or the business opportunities of, the Sponsors (as defined in our amended and restated certificate of incorporation) or any of their officers, directors, agents, stockholders, members, partners, affiliates and subsidiaries (other than our directors that are presented business opportunities in their capacity as our directors) and that they have no obligation to offer us those investments or opportunities; and

provide that our bylaws can be amended by our board of directors.

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Forum Selection

Our amended and restated certificate of incorporation provides that unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will, to the fullest extent permitted by applicable law, be the sole and exclusive forum for:

any derivative action or proceeding brought on our behalf;

any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, employees or agents to us or our stockholders;

any action asserting a claim against us arising pursuant to any provision of the DGCL, our amended and restated certificate of incorporation or our amended and restated bylaws; or

any action asserting a claim against us that is governed by the internal affairs doctrine, in each such case subject to such Court of Chancery having personal jurisdiction over the indispensable parties named as defendants therein.

Our amended and restated certificate of incorporation also provides that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock will be deemed to have notice of, and to have consented to, this forum selection provision. Although we believe these provisions will benefit us by providing increased consistency in the application of Delaware law for the specified types of actions and proceedings, the provisions may have the effect of discouraging lawsuits against our directors, officers, employees and agents. The enforceability of similar exclusive forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that, in connection with one or more actions or proceedings described above, a court could rule that this provision in our amended and restated certificate of incorporation is inapplicable or unenforceable.

Limitations of Liability and Indemnification Matters

Our amended and restated certificate of incorporation limits the liability of our directors for monetary damages for breach of their fiduciary duty as directors, except for liability that cannot be eliminated under the DGCL. Delaware law provides that directors of a company will not be personally liable for monetary damages for breach of their fiduciary duty as directors, except for liabilities:

for any breach of their duty of loyalty to us or our stockholders;

for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law;

for unlawful payment of dividend or unlawful stock repurchase or redemption, as provided under Section 174 of the DGCL;
or

for any transaction from which the director derived an improper personal benefit.

Any amendment, repeal or modification of these provisions will be prospective only and would not affect any limitation on liability of a director for acts or omissions that occurred prior to any such amendment, repeal or modification.

Our amended and restated bylaws also provide that we will indemnify our directors and officers to the fullest extent permitted by Delaware law. If Delaware law is amended to authorize corporate action further eliminating or limiting the personal liability of a director, then the liability of our directors will be eliminated or limited to the fullest extent permitted by Delaware law, as so amended. Our amended and restated bylaws also permit us to purchase insurance on behalf of any officer, director, employee or other agent for any liability arising out of that person's actions as our officer, director, employee or agent, regardless of whether Delaware law would permit indemnification. We have entered into

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indemnification agreements with each of our directors and officers. These agreements require us to indemnify these individuals to the fullest extent permitted under Delaware law against liability that may arise by reason of their service to us, and to advance expenses incurred as a result of any proceeding against them as to which they could be indemnified. We believe that the limitation of liability provision in our amended and restated certificate of incorporation and the indemnification agreements facilitates our ability to continue to attract and retain qualified individuals to serve as directors and officers.

The limitation of liability and indemnification provisions in our certificate of incorporation and bylaws may discourage stockholders from bringing a lawsuit against directors for breach of their fiduciary duties. They may also reduce the likelihood of derivative litigation against directors and officers, even though an action, if successful, might benefit us and our stockholders. A stockholder's investment may be harmed to the extent we pay the costs of settlement and damage awards against directors and officers pursuant to these indemnification provisions. Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers and controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act, and is, therefore, unenforceable. There is no pending litigation or proceeding naming any of our directors or officers as to which indemnification is being sought, nor are we aware of any pending or threatened litigation that may result in claims for indemnification by any director or officer.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company, LLC.

Listing

Our common stock is listed on the New York Stock Exchange under the symbol "RSPP."

Table of Contents**SELLING STOCKHOLDERS**

This prospectus covers the offering of up to 4,600,000 shares of our common stock by the selling stockholders identified below. The selling stockholders identified below may from time to time offer and sell pursuant to this prospectus all or any portion of the 4,600,000 shares of our common stock registered hereunder. We are registering these 4,600,000 shares of our common stock for sale by the selling stockholders identified below pursuant to a registration rights agreement (the "Registration Rights Agreements"), dated January 23, 2014, between us, such selling stockholders and certain other stockholders, which we entered into in connection with our initial public offering ("IPO"). Pursuant to the Registration Rights Agreement, we will pay all expenses relating to the registration and offering of these shares, except that the selling stockholders will pay any underwriting discounts or commissions. However, we will not receive any of the proceeds from the sales of common stock by the selling stockholders. The term "selling stockholders" includes the stockholders listed in the table below and their transferees, pledgees, donees, assignees or other successors.

No offer or sale under this prospectus may be made by a stockholder unless that holder is listed in the table below, in a supplement to this prospectus or in an amendment to the related registration statement that has become effective. We may supplement or amend this prospectus to include additional selling stockholders or additional shares of our common stock held by the selling stockholders identified below.

The following table sets forth information relating to the selling stockholders as of March 6, 2015, based on information supplied to us by the selling stockholders on or prior to that date. We have not sought to verify such information. The selling stockholders may hold or acquire at any time shares of our common stock in addition to the shares offered by this prospectus and may have acquired additional shares of our common stock since the date on which the information reflected herein was provided to us. Additionally, the selling stockholders may have sold or transferred some or all of their shares of our common stock in transactions exempt from the registration requirements of the Securities Act since such date. Other information about the selling stockholders may also change over time. The following table sets forth the maximum number of shares of our common stock that may be sold under this prospectus by the selling stockholders identified below. The selling stockholders are not obligated to sell any of the shares of common stock offered by this prospectus. The selling stockholders reserve the right to accept or reject, in whole or in part, any proposed sale of shares. The selling stockholders may also offer and sell less than the number of shares indicated. The selling stockholders are not making any representation that any shares covered by this prospectus will or will not be offered for sale.

Name of Selling Stockholder	Shares of Common Stock Beneficially Owned Prior to the Offering(1)		Shares of Common Stock That May be Offered	Shares of Common Stock Beneficially Owned After Completion of the Offering(2)	
	Number	Percent(3)		Number	Percent(3)
ACTOIL, LLC(4)	10,816,626	13.8%	2,876,102	7,940,524	10.1%
Natural Gas Partners VIII, L.P.(5)	541,470	*	143,975	397,495	*
Production Opportunities II, L.P.(6)	5,941,873	7.6%	1,579,923	4,361,950	5.6%

*
Less than 1%.

(1) The amounts and percentages of common stock beneficially owned are reported on the bases of regulations of the SEC governing the determination of beneficial ownership of securities. Under the rules of the SEC, a person is deemed to be a "beneficial owner" of a security if that person has or shares voting power, which includes the power to vote or direct the voting of such security, or investment power, which includes the power to dispose of or to direct the disposition of such security. Securities that can be so acquired are deemed to be outstanding for purposes of

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computing such person's ownership percentage, but not for purposes of computing any other person's percentage. Under these rules, more than one person may be deemed beneficial owner of the same securities, and a person may be deemed to be a beneficial owner of securities as to which such person has no economic interest. Except as otherwise indicated in these footnotes, each of the beneficial owners has, to our knowledge, sole voting and investment power with respect to the indicated shares of common stock.

- (2) Assumes the sale of all shares held by the selling stockholders covered by this prospectus and assumes the selling stockholders do not acquire beneficial ownership of any additional shares of our common stock. The selling stockholders are not obligated to sell any of the shares of our common stock covered by this prospectus. Also assumes no sale by us of shares of our common stock under this registration statement.
- (3) Percentage of beneficial ownership is based upon 78,267,452 shares of common stock outstanding as of March 12, 2015.
- (4) ACTOIL, LLC is a wholly owned subsidiary of TIAA Oil and Gas Investments, LLC, its sole member. TIAA Oil and Gas Investments, LLC is a wholly owned subsidiary of Teachers Insurance and Annuity Association of America, its sole member. Because of the foregoing relationships, each of ACTOIL, LLC, TIAA Oil and Gas Investments, LLC and Teachers Insurance and Annuity Association of America may be deemed to have voting and dispositive power over the reported shares and may also be deemed to be the beneficial owner of these shares. Each of ACTOIL, LLC, TIAA Oil and Gas Investments, LLC and Teachers Insurance and Annuity Association of America disclaim beneficial ownership of the reported shares in excess of its pecuniary interest in the shares.
- (5) GFW VIII, L.L.C. and G.F.W. Energy VIII, L.P. may be deemed to share voting and dispositive power over the reported shares and therefore may also be deemed to be the beneficial owner of these shares by virtue of GFW VIII, L.L.C. being the sole general partner of G.F.W. Energy VIII, L.P., which is the general partner of Natural Gas Partners VIII, L.P. Kenneth A. Hersh, an Authorized Member of GFW VIII, L.L.C., may also be deemed to share the power to vote, or to direct the vote, and to dispose, or to direct the disposition of, such shares. Mr. Hersh does not own directly any shares of our common stock. David Albin, one of our directors, may also be deemed to share the power to vote, or to direct the vote, and to dispose, or to direct the disposition of, such shares by virtue of his shared control of GFW VIII, L.L.C. Mr. Albin does not own directly any shares of our common stock. GFW VIII, L.L.C. has delegated full power and authority to manage NGP VIII to NGP Energy Capital Management, L.L.C., and accordingly, NGP Energy Capital Management, L.L.C. may be deemed to share voting and dispositive power over these shares and therefore may also be deemed to be the beneficial owner of these shares. Each of GFW VIII, L.L.C., G.F.W. Energy VIII, NGP Energy Capital Management, L.L.C. and Messrs. Hersh and Albin disclaim beneficial ownership of the reported shares in excess of its or his pecuniary interest in the shares.
- (6) Natural Gas Partners IX, L.P. and NGP IX Offshore Holdings, L.P. (together, "NGP IX") jointly own Production Opportunities II, L.P. The sole general partner of each of Natural Gas Partners IX, L.P. and NGP IX Offshore Holdings, L.P. is G.F.W. Energy IX, L.P., and the sole general partner of G.F.W. Energy IX, L.P. is GFW IX, L.L.C. As such, NGP IX, G.F.W. Energy IX, L.P. and GFW IX, L.L.C. may be deemed to share voting and dispositive power over the reported shares and therefore may also be deemed to be the beneficial owner of these shares. Kenneth A. Hersh, an Authorized Member of GFW IX, L.L.C., may also be deemed to share the power to vote, or to direct the vote, and to dispose, or to direct the disposition of, such shares. Mr. Hersh does not own directly any shares of our common stock. David Albin, one of our directors, may also be deemed to share the power to vote, or to direct the vote, and to dispose, or to direct the

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disposition of, those shares by virtue of his shared control of GFW IX, L.L.C. Mr. Albin does not own directly any shares of our common stock. GFW IX, L.L.C. has delegated full power and authority to manage Production Opportunities II, L.P. to NGP Energy Capital Management, L.L.C., and accordingly, NGP Energy Capital Management, L.L.C. may be deemed to share voting and dispositive power over these shares and therefore may also be deemed to be the beneficial owner of these shares. Each of NGP IX, G.F.W. Energy IX, L.P., GFW IX, L.L.C., NGP Energy Capital Management, L.L.C. and Messrs. Hersh and Albin disclaim beneficial ownership of the reported shares in excess of its or his pecuniary interest in the shares.

Material Relationships

Except as set forth in, or incorporated by reference into, this prospectus or in any prospectus supplement, none of the selling stockholders has held any position or office with, been employed by, or otherwise has had a material relationship with us or any of our affiliates during the three years prior to the date of this prospectus.

Transactions with the Selling Stockholders in Connection with Our IPO

In January 2014, in connection with our IPO, we entered into the following transactions with the selling stockholders:

We acquired net profits interests in oil and natural gas properties in the Permian Basin from ACTOIL, LLC in exchange for 10,816,626 shares of our common stock.

We acquired working interests in certain acreage and wells in the Permian Basin from Rising Star Energy Development Co., L.L.C. ("Rising Star") in exchange for 1,793,123 shares of our common stock and the right to receive approximately \$1.7 million in cash. Rising Star's sole member and the general partner of Rising Star's sole member are owned by Natural Gas Partners VIII, L.P., certain members of our management team and certain other persons. In January 2015, Rising Star distributed all of its shares of the Company's common stock to its sole member, which in turn distributed all such shares to its limited partners (including Natural Gas Partners VIII, L.P.) and to its general partner, which in turn made a distribution to its members (including Natural Gas Partners VIII, L.P.), on a pro rata basis. In connection with such distribution, Rising Star assigned its rights and obligations under the Stockholders' Agreement (defined and described below) to Natural Gas Partners VIII, L.P. and all of its rights and obligations under the Registration Rights Agreement to all of the persons who received shares of the Company's common stock from Rising Star's sole member or the general partner of Rising Star's sole member.

The members of RSP Permian, L.L.C. contributed all of their interests in RSP Permian, L.L.C. to RSP Permian Holdco, L.L.C., a newly formed entity that is wholly owned by such members, and RSP Permian Holdco, L.L.C. contributed all of its interests in RSP Permian, L.L.C. to us in exchange for 28,536,427 shares of our common stock, an assignment of RSP Permian, L.L.C.'s pro rata share of an escrow related to a disposition of certain working interests and the right to receive approximately \$27.7 million in cash. RSP Permian Holdco, L.L.C. is owned by Production Opportunities II, L.P., certain members of our management team and certain of our employees. In December 2014, in anticipation of RSP Permian Holdco, L.L.C.'s pending liquidation, RSP Permian Holdco, L.L.C. distributed all of its shares of the Company's common stock to its members (including Production Opportunities II, L.P.), on a pro rata basis. In connection with such distribution, RSP Permian Holdco, L.L.C. assigned all of its rights and obligations under the Stockholders' Agreement to Production Opportunities II, L.P. and all of its rights and obligations under the Registration Rights Agreement to its members.

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Stockholders' Agreement

We are party to a stockholders' agreement (the "Stockholders' Agreement") with Production Opportunities II, L.P., Natural Gas Partners VIII, L.P. and certain other stockholders. We entered into the Stockholders' Agreement on January 23, 2014 in connection with our IPO. The Stockholders' Agreement provides Production Opportunities II, L.P., Ted Collins, Jr. and Wallace Family Partnership, LP with the right to designate a certain number of nominees to our board of directors, subject to certain ownership requirements. Production Opportunities II, L.P., in particular, has the right to designate two nominees to our board of directors if it and its affiliates own 15% or more of the outstanding shares of our common stock and the right to designate one nominee if it and its affiliates own less than 15% but more than 5% of the outstanding shares of our common stock. In addition, pursuant to the Stockholders' Agreement, for so long as Production Opportunities II, L.P. and its affiliates collectively own 15% or more of the outstanding shares of our common stock, any committee of our board of directors is to include in its membership at least one director designated by Production Opportunities II, L.P., except to the extent that such membership would violate applicable securities laws or stock exchange rules.

As a result of an underwritten public offering of our common stock by us and certain of our stockholders in August 2014, Production Opportunities II, L.P. and its affiliates owned less than 15% (but more than 5%) of the outstanding shares of our common stock and therefore lost the right to have one of its nominees serve on each committee of our board of directors as well as the right to designate two nominees. However, the other parties to the Stockholders' Agreement, including us, waived the requirement to have a nominee of Production Opportunities II, L.P. tender his resignation to our board of directors.

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PLAN OF DISTRIBUTION

We and the selling stockholders (including any selling stockholder's transferees, pledgees, donees, assignees or other successors-in-interest) may offer and sell the securities covered by this prospectus from time to time in one or more transactions, including without limitation:

directly to one or more purchasers;

through agents;

to or through underwriters, brokers or dealers; or

through a combination of any of these methods.

In addition, the manner in which we and the selling stockholders may sell some or all of the securities covered by this prospectus includes any method permitted by law, including, without limitation, through:

a block trade in which a broker-dealer will attempt to sell as agent, but may position or resell a portion of the block, as principal, in order to facilitate the transaction;

purchases by a broker-dealer, as principal, and resale by the broker-dealer for its account;

ordinary brokerage transactions and transactions in which a broker solicits purchasers; or

privately negotiated transactions.

We and the selling stockholders may also enter into hedging transactions. For example, we and the selling stockholders may:

enter into transactions with a broker-dealer or affiliate thereof in connection with which such broker-dealer or affiliate will engage in short sales of the common stock pursuant to this prospectus, in which case such broker-dealer or affiliate may use shares of common stock received from us and the selling stockholders to close out its short positions;

sell securities short and redeliver such shares to close out the short positions;

enter into option or other types of transactions that require us and the selling stockholders to deliver common stock to a broker-dealer or an affiliate thereof, who will then resell or transfer the common stock under this prospectus; or

loan or pledge the common stock to a broker-dealer or an affiliate thereof, who may sell the loaned shares or, in an event of default in the case of a pledge, sell the pledged shares pursuant to this prospectus.

The securities covered by this prospectus may be sold:

on a national securities exchange;

in the over-the-counter market; or

in transactions otherwise than on an exchange or in the over-the-counter market.

In addition, we and the selling stockholders may enter into derivative or hedging transactions with third parties, or sell securities not covered by this prospectus to third parties in privately negotiated transactions. In connection with such a transaction, the third parties may sell securities covered by and pursuant to this prospectus and an applicable prospectus supplement or pricing supplement, as the case may be. If so, the third party may use securities borrowed from us, the selling stockholders or others to settle such sales and may use securities received from us or the selling stockholders to close out any related short positions. We and the selling stockholders may also loan or pledge securities covered by this prospectus and an applicable prospectus supplement to third parties, who may sell the loaned

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securities or, in an event of default in the case of a pledge, sell the pledged securities pursuant to this prospectus and the applicable prospectus supplement or pricing supplement, as the case may be.

If required by applicable law, a prospectus supplement will state the terms of the offering of the securities, including:

the name or names of any participating underwriters, brokers, dealers or agents and the amounts of securities underwritten or purchased by each of them, if any;

the public offering price or purchase price of the securities and the net proceeds to be received by us and/or the selling stockholders from the sale;

any delayed delivery arrangements;

any underwriting discounts, commissions or agency fees and other items constituting underwriters', brokers', dealers' or agents' compensation;

any discounts or concessions allowed or reallowed or paid to dealers;

any securities exchange or markets on which the securities may be listed; and

other material terms of the offering.

The offer and sale of the securities described in this prospectus by us, the selling stockholders, the underwriters or the third parties described above may be effected from time to time in one or more transactions, including privately negotiated transactions, either:

at a fixed price or prices, which may be changed;

at market prices prevailing at the time of sale;

at prices related to the prevailing market prices; or

at negotiated prices.

In addition to selling common stock under this prospectus, the selling stockholders may:

transfer common stock in other ways not involving market maker or established trading markets, including directly by gift, distribution, or other transfer;

sell common stock under Rule 144 or Rule 145 of the Securities Act rather than under this prospectus, if the transaction meets the requirements of Rule 144 or Rule 145; or

sell common stock by any other legally available means.

General

Any public offering price and any discounts, commissions, concessions or other items constituting compensation allowed or reallocated or paid to underwriters, dealers, agents or remarketing firms may be changed from time to time. Any selling stockholders, underwriters, dealers, agents and remarketing firms that participate in the distribution of the offered securities may be "underwriters" as defined in the Securities Act. Any discounts or commissions they receive from us or the selling stockholders and any profits they receive on the resale of the offered securities may be treated as underwriting discounts and commissions under the Securities Act. We and the selling stockholders will identify any underwriters, agents or dealers and describe their commissions, fees or discounts in the applicable prospectus supplement or pricing supplement, as the case may be.

We, the selling stockholders and other persons participating in the sale or distribution of the securities will be subject to applicable provisions of the Exchange Act, and the rules and regulations thereunder, including Regulation M. This regulation may limit the timing of purchases and sales of any

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of the securities by us and/or the selling stockholders or any other person. The anti-manipulation rules under the Exchange Act may apply to sales of securities in the market and to the activities of us and the selling stockholders and any affiliates of ours and the selling stockholders. Furthermore, Regulation M may restrict the ability of any person engaged in the distribution for a period of up to five business days before the distribution. These restrictions may affect the marketability of the securities and the ability of any person or entity to engage in market-making activities with respect to the securities.

We and the selling stockholders are not restricted as to the price or prices at which we may sell the securities. Sales of such securities may have an adverse effect on the market price of the securities.

Moreover, it is possible that a significant number of shares of common stock could be sold at the same time, which may have an adverse effect on the market price of the securities.

We cannot assure you that we or the selling stockholders will sell all or any portion of the securities offered hereby.

Underwriters and Agents

If underwriters are used in a sale, they will acquire the offered securities for their own account. The underwriters may resell the offered securities in one or more transactions, including negotiated transactions. These sales may be made at a fixed public offering price or prices, which may be changed, at market prices prevailing at the time of the sale, at prices related to such prevailing market prices or at negotiated prices. We and the selling stockholders may offer the securities to the public through an underwriting syndicate or through a single underwriter. The underwriters in any particular offering will be mentioned in the applicable prospectus supplement or pricing supplement, as the case may be.

Unless otherwise specified in connection with any particular offering of securities, the obligations of the underwriters to purchase the offered securities will be subject to certain conditions contained in an underwriting agreement that we and the applicable selling stockholders, if any, will enter into with the underwriters at the time of the sale to them. The underwriters will be obligated to purchase all of the securities of the series offered if any of the securities are purchased, unless otherwise specified in connection with any particular offering of securities. Any initial offering price and any discounts or concessions allowed, reallocated or paid to dealers may be changed from time to time.

We and the selling stockholders may designate agents to sell the offered securities. Unless otherwise specified in connection with any particular offering of securities, the agents will agree to use their best efforts to solicit purchases for the period of their appointment. We and the selling stockholders may also sell the offered securities to one or more remarketing firms, acting as principals for their own accounts or as agents for us or any selling stockholders. These firms will remarket the offered securities upon purchasing them in accordance with a redemption or repayment pursuant to the terms of the offered securities. A prospectus supplement or pricing supplement, as the case may be, will identify any remarketing firm and will describe the terms of its agreement, if any, with us and/or the selling stockholders and its compensation.

In connection with offerings made through underwriters or agents, we and the selling stockholders may enter into agreements with such underwriters or agents pursuant to which we and the selling stockholders receive outstanding securities in consideration for the securities being offered to the public for cash. In connection with these arrangements, the underwriters or agents may also sell securities covered by this prospectus to hedge their positions in these outstanding securities, including in short sale transactions. If so, the underwriters or agents may use the securities received from us or the selling stockholders under these arrangements to close out any related open borrowings of securities.

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Dealers

We and the selling stockholders may sell the offered securities to dealers as principals. We and the selling stockholders may negotiate and pay dealers' commissions, discounts or concessions for their services. The dealer may then resell such securities to the public either at varying prices to be determined by the dealer or at a fixed offering price agreed to with us and/or the selling stockholders at the time of resale. Dealers engaged by us or the selling stockholders may allow other dealers to participate in resales.

Direct Sales

We and the selling stockholders may choose to sell the offered securities directly. In this case, no underwriters or agents would be involved.

Institutional Purchasers

We and the selling stockholders may authorize agents, dealers or underwriters to solicit certain institutional investors to purchase offered securities on a delayed delivery basis pursuant to delayed delivery contracts providing for payment and delivery on a specified future date. The applicable prospectus supplement or pricing supplement, as the case may be will provide the details of any such arrangement, including the offering price and commissions payable on the solicitations.

We and the selling stockholders will enter into such delayed contracts only with institutional purchasers that we or the selling stockholders approve. These institutions may include commercial and savings banks, insurance companies, pension funds, investment companies and educational and charitable institutions.

Indemnification; Other Relationships

We and the selling stockholders may have agreements with agents, underwriters, dealers and remarketing firms to indemnify them against certain civil liabilities, including liabilities under the Securities Act. Agents, underwriters, dealers and remarketing firms, and their affiliates, may engage in transactions with, or perform services for, us or the selling stockholders in the ordinary course of business. This includes commercial banking and investment banking transactions.

We may agree to indemnify in certain circumstances the selling stockholders against certain liabilities, including liabilities under the Securities Act. The selling stockholders may agree to indemnify us in certain circumstances against certain liabilities, including liabilities under the Securities Act.

Market-Making; Stabilization and Other Transactions

In connection with any offering of common stock, the underwriters may purchase and sell shares of common stock in the open market. These transactions may include short sales, syndicate covering transactions and stabilizing transactions. Short sales involve syndicate sales of common stock in excess of the number of shares to be purchased by the underwriters in the offering, which creates a syndicate short position. "Covered" short sales are sales of shares made in an amount up to the number of shares represented by the underwriters' over-allotment option. In determining the source of shares to close out the covered syndicate short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the over-allotment option. Transactions to close out the covered syndicate short involve either purchases of the common stock in the open market after the distribution has been completed or the exercise of the over-allotment option. The underwriters may also make "naked" short sales of shares in excess of the over-allotment option. The underwriters must close out any naked short position by purchasing shares of common stock in the open market. A naked short position is more

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likely to be created if the underwriters are concerned that there may be downward pressure on the price of the shares in the open market after pricing that could adversely affect investors who purchase in the offering. Stabilizing transactions consist of bids for or purchases of shares in the open market while the offering is in progress for the purpose of pegging, fixing or maintaining the price of the securities.

In connection with any offering, the underwriters may also engage in penalty bids. Penalty bids permit the underwriters to reclaim a selling concession from a syndicate member when the securities originally sold by the syndicate member are purchased in a syndicate covering transaction to cover syndicate short positions. Stabilizing transactions, syndicate covering transactions and penalty bids may cause the price of the securities to be higher than it would be in the absence of the transactions. The underwriters may, if they commence these transactions, discontinue them at any time.

Fees and Commissions

We will pay the expenses, other than underwriting discounts and commissions, associated with the registration and sale of shares to be sold by the selling stockholders. The selling stockholders will pay any underwriting discounts or selling commissions for such sales.

Pursuant to a requirement by the Financial Industry Regulatory Authority, Inc. ("FINRA"), the maximum commission or discount to be received by any FINRA member or independent broker-dealer in connection with the sale of any securities being registered by this prospectus may not be greater than eight percent of the offering proceeds received by us and any selling stockholders.

If 5% or more of the net proceeds of any offering of securities made under this prospectus will be received by FINRA members participating in the offering or affiliates or associated persons of such FINRA members, the offering will be conducted in accordance with FINRA Rule 5121.

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LEGAL MATTERS

The validity of any securities offered under this prospectus will be passed upon for us by Vinson & Elkins L.L.P., Houston, Texas. Any underwriters will also be advised about legal matters by their own counsel, which will be named in the applicable prospectus supplement.

EXPERTS

The financial statements of RSP Permian, Inc. incorporated by reference in this prospectus and elsewhere in the registration statement have been so incorporated by reference in reliance upon the report of Grant Thornton LLP, independent registered public accountants, upon the authority of said firm as experts in accounting and auditing.

Estimates of our oil and natural gas reserves and related future net cash flows related to our properties as of December 31, 2014 incorporated by reference in this prospectus and elsewhere in the registration statement were based upon reserve reports prepared by independent petroleum engineers, Netherland, Sewell & Associates, Inc. We have included these estimates in reliance on the authority of such firm as an expert in such matters.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We file annual, quarterly, current and other reports and other information with the SEC. You may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Room 1580, Washington, D.C., 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the Public Reference Room. Our SEC filings are also available to the public from commercial document retrieval services and through the SEC's website at <http://www.sec.gov>.

Our common stock is listed on the New York Stock Exchange under the symbol "RSPP." Our reports and other information filed with the SEC can also be inspected at the offices of the New York Stock Exchange, 20 Broad Street, New York, New York 10005.

We also make available free of charge on our Internet website at www.rsppermian.com all of the documents that we file with the SEC as soon as reasonably practicable after we electronically file those documents with the SEC. Information contained on our website is not incorporated by reference into this prospectus, and you should not consider information contained on our website as part of this prospectus.

INCORPORATION BY REFERENCE

We "incorporate by reference" information from other documents that we file with the SEC into this prospectus, which means that we disclose important information to you by referring you to those documents. The information incorporated by reference is deemed to be part of this prospectus. You should not assume that the information in this prospectus is current as of the date other than the date on the cover page of this prospectus.

We incorporate by reference in this prospectus the documents listed below and any subsequent filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (excluding information deemed to be furnished and not filed with the SEC) after the date of this prospectus and before the filing of a post-effective amendment to the registration statement of which this prospectus is

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a part that indicates that all securities offered hereunder have been sold or that deregisters all securities then remaining unsold:

The description of our common stock contained in our Registration Statement on Form 8-A, as filed with the SEC on January 14, 2014, including any amendment to that form that we may file in the future for the purpose of updating the description of our common stock;

Our Annual Report on Form 10-K for the year ended December 31, 2014 and Part III of our Annual Report on Form 10-K for the year ended December 31, 2013; and

Our Current Report on Form 8-K, as filed with the SEC on March 17, 2015.

The most recent information that we file with the SEC automatically updates and supersedes more dated information.

You may request a copy of any document incorporated by reference in this prospectus and any exhibit specifically incorporated by reference in those documents, at no cost, by writing or telephoning us at the following address or phone number:

RSP Permian, Inc.
3141 Hood Street, Suite 500
Dallas, Texas 75219
Attention: Investor Relations
Telephone: (214) 252-2700

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6,000,000 Shares

RSP Permian, Inc.

Common Stock

PROSPECTUS SUPPLEMENT

October , 2015

Goldman, Sachs & Co.
