

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
 Stylesheet Version v1.2

EPAS ID: PAT4675388

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|-----------------------------------|------------------------------------|
| SUBMISSION TYPE: | NEW ASSIGNMENT |
| NATURE OF CONVEYANCE: | SECURITY INTEREST |
| CONVEYING PARTY DATA | |
| Name | Execution Date |
| FAIRMOUNT SANTROL INC. | 11/01/2017 |
| SELF-SUSPENDING PROPPANT LLC | 11/01/2017 |
| TECHNISAND, INC. | 11/01/2017 |
| RECEIVING PARTY DATA | |
| Name: | PNC BANK, NATIONAL ASSOCIATION |
| Street Address: | COMMERCIAL LOAN SERVICE CENTER/DCC |
| Internal Address: | 500 FIRST AVENUE |
| City: | PITTSBURGH |
| State/Country: | PENNSYLVANIA |
| Postal Code: | 15219 |
| PROPERTY NUMBERS Total: 37 | |
| Property Type | Number |
| Patent Number: | 7275643 |
| Application Number: | 09129063 |
| Application Number: | 09616648 |
| Application Number: | 09055549 |
| Application Number: | 09444901 |
| Application Number: | 11541874 |
| Application Number: | 10793429 |
| Application Number: | 10195989 |
| Application Number: | 10611200 |
| Application Number: | 11582644 |
| Application Number: | 11640813 |
| Application Number: | 11645991 |
| Application Number: | 12832171 |
| Application Number: | 12914560 |
| Application Number: | 15228189 |
| Application Number: | 12908411 |
| Application Number: | 15339986 |

PATENT

| Property Type | Number |
|---------------------|--------------|
| Application Number: | 13599828 |
| Application Number: | 15081037 |
| Application Number: | 15721983 |
| Application Number: | 13838806 |
| Patent Number: | 9644139 |
| Application Number: | 15078371 |
| Application Number: | 14197596 |
| Application Number: | 14631946 |
| Application Number: | 15091987 |
| Application Number: | 15595722 |
| Application Number: | 62240611 |
| Application Number: | 15782066 |
| Application Number: | 15340000 |
| Application Number: | 62428258 |
| Application Number: | 15782922 |
| Application Number: | 62396960 |
| Application Number: | 15708957 |
| Application Number: | 62473677 |
| Application Number: | 62526614 |
| PCT Number: | US2017056287 |

CORRESPONDENCE DATA

Fax Number: (215)832-5619

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 215-569-5619

Email: PECSENYE@BLANKROME.COM

Correspondent Name: TIMOTHY D. PECSENYE

Address Line 1: BLANK ROME LLP

Address Line 2: ONE LOGAN SQUARE

Address Line 4: PHILADELPHIA, PENNSYLVANIA 19103

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|--------------------------------|-----------------------|
| ATTORNEY DOCKET NUMBER: | 074658-17086 |
| NAME OF SUBMITTER: | TIMOTHY D. PECSENYE |
| SIGNATURE: | /Timothy D. Pecsénye/ |
| DATE SIGNED: | 11/06/2017 |

Total Attachments: 6

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PATENT SECURITY AGREEMENT

This **PATENT SECURITY AGREEMENT**, dated as of November 1, 2017 (as it may be amended, restated, supplemented or otherwise modified from time to time, this “Agreement”), is made by the entities identified as grantors on the signature pages hereto (collectively, the “Grantors”) in favor of PNC Bank, National Association as collateral agent (in such capacity, together with its successors and permitted assigns, the “Collateral Agent”) for the Secured Parties.

WHEREAS, the Grantors are party to the Pledge and Security Agreement dated as of November 1, 2017 (the “Pledge and Security Agreement”) between the Grantors and the other grantors party thereto and the Collateral Agent pursuant to which the Grantors granted a security interest to the Collateral Agent in the Patent Collateral (as defined below) and are required to execute and deliver this Agreement.

NOW, THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Grantors hereby agree with the Collateral Agent as follows:

SECTION. 1. Defined Terms

Unless otherwise defined herein, terms defined in the Pledge and Security Agreement and used herein have the meaning given to them in the Pledge and Security Agreement.

SECTION 2. Grant of Security Interest

Each Grantor hereby grants to the Collateral Agent, for the benefit of the Secured Parties, a security interest in and continuing lien on all of such Grantor’s right, title and interest in, to and under the following, in each case whether now owned or existing or hereafter acquired, developed, created or arising and wherever located (collectively, the “Patent Collateral”): (i) each patent and patent application listed in Schedule A attached hereto, (ii) all reissues, divisions, continuations, continuations-in-part, extensions, renewals, and reexaminations thereof, (iii) all improvements thereto, (iv) the right to sue or otherwise recover for any past, present and future infringement or other violation thereof, (v) all Proceeds of the foregoing, including, without limitation, license fees, royalties, income, payments, claims, damages, and proceeds of suit now or hereafter due and/or payable with respect thereto, and (vi) all other rights of any kind accruing thereunder or pertaining thereto throughout the world.

SECTION 3. Security Agreement

The security interest granted pursuant to this Agreement is granted in conjunction with the security interest granted to the Collateral Agent for the Secured Parties pursuant to the Pledge and Security Agreement, and the Grantors hereby acknowledge and affirm that the rights and remedies of the Collateral Agent with respect to the security interest in the Patent Collateral made and granted hereby are more fully set forth in the Pledge and Security Agreement, the terms and provisions of which are incorporated by reference herein as if fully set forth herein. In the event that any provision of this Agreement is deemed to conflict with the Pledge and Security Agreement, the provisions of the Pledge and Security Agreement shall control.

SECTION 4. Termination

Upon the Payment in Full of the Obligations in accordance with Section 9.08(d) of the Credit Agreement and termination of the Pledge and Security Agreement, the Collateral Agent shall execute, acknowledge and deliver to the Grantors a written instrument in recordable form releasing

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the collateral pledge, grant, assignment, lien and security interest in the Patent Collateral under this Agreement.

SECTION 5. Governing Law

THIS AGREEMENT AND THE RIGHTS AND OBLIGATIONS OF THE PARTIES HEREUNDER AND ALL CLAIMS AND CONTROVERSIES ARISING OUT OF THE SUBJECT MATTER HEREOF WHETHER SOUNDING IN CONTRACT LAW, TORT LAW OR OTHERWISE SHALL BE GOVERNED BY, AND SHALL BE CONSTRUED AND ENFORCED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK, WITHOUT REGARD TO CONFLICTS OF LAW PROVISIONS THAT WOULD RESULT IN THE APPLICATION OF ANY OTHER LAW (OTHER THAN ANY MANDATORY PROVISIONS OF LAW RELATING TO THE LAW GOVERNING PERFECTION AND THE EFFECT OF PERFECTION OF THE SECURITY INTEREST GRANTED HEREBY).

SECTION 6. Counterparts

This Agreement may be executed in one or more counterparts and by different parties hereto in separate counterparts, each of which when so executed and delivered shall be deemed an original, but all such counterparts together shall constitute but one and the same instrument.

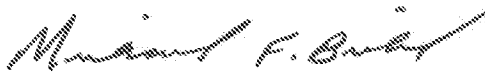
SECTION 7. INTERCREDITOR AGREEMENT

Notwithstanding anything herein to the contrary, the lien and security interest granted to the Collateral Agent pursuant to this Agreement and the exercise of any right or remedy by the Collateral Agent hereunder are subject to the provisions of the Intercreditor Agreement, dated as of November 1, 2017 (as amended, restated, supplemented or otherwise modified from time to time, the "Intercreditor Agreement"), among FMSA Inc. and the other Grantors, PNC Bank, National Association, as ABL Collateral Agent and Barclays Bank PLC, as Fixed Asset Collateral Agent and certain other persons party or that may become party thereto from time to time. In the event of any conflict between the terms of the Intercreditor Agreement and this Agreement, the terms of the Intercreditor Agreement shall govern and control.


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IN WITNESS WHEREOF, each Grantor has caused this Agreement to be executed and delivered by its duly authorized officer as of the date first set forth above.


FAIRMOUNT SANTROL INC.

By: 
Name: Michael F. Biehl
Title: Executive Vice President, Chief Financial
Officer, Assistant Secretary and Treasurer

SELF-SUSPENDING PROPPANT LLC

By: 
Name: Michael F. Biehl
Title: Executive Vice President, Chief Financial
Officer, Assistant Secretary and Treasurer

TECHNISAND, INC.

By: 
Name: Michael F. Biehl
Title: Executive Vice President, Chief Financial
Officer, Assistant Secretary and Treasurer

[SIGNATURE PAGE TO PATENT SECURITY AGREEMENT]

Accepted and Agreed:

PNC BANK, NATIONAL ASSOCIATION,
as Collateral Agent

By: 

Name: Michael Gasser
Title: Senior Vice President

[SIGNATURE PAGE TO PATENT SECURITY AGREEMENT]

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PATENT
REEL: 044040 FRAME: 0386

SCHEDULE A
to
PATENT SECURITY AGREEMENT

PATENTS AND PATENT APPLICATIONS

| Title | Grantor | Application No. | Filing Date | Patent No. |
|---|---|-----------------|-------------|------------|
| PROPPANT CONTAINING BONDABLE PARTICLES AND REMOVABLE PARTICLES | TechniSand, Inc. | 09/129,063 | 04-Aug-1998 | 6,114,410 |
| PROPPANT CONTAINING BONDABLE PARTICLES AND REMOVABLE PARTICLES | TechniSand, Inc. | 09/616,648 | 14-Jul-2000 | 6,328,105 |
| INJECTION MOLDED DEGRADABLE CASING PERFORATION BALL SEALERS | TechniSand, Inc. and Fairmount Santrol Inc. | 09/055,549 | 06-Apr-1998 | 5,990,051 |
| INJECTION MOLDED DEGRADABLE CASING PERFORATION BALL SEALERS | Fairmount Santrol Inc. | 09/444,901 | 22-Nov-1999 | 6,380,138 |
| PROPPANTS WITH SOLUBLE COMPOSITE COATINGS | Fairmount Santrol Inc. | 11/541,874 | 02-Oct-2006 | 7,490,667 |
| SOLUBLE FIBERS FOR USE IN RESIN COATED PROPPANT | Fairmount Santrol Inc. | 10/793,429 | 04-Mar-2004 | 7,244,492 |
| DOWNHOLE CHEMICAL DELIVERY SYSTEM FOR OIL AND GAS WELLS | TechniSand, Inc. | 10/195,989 | 16-Jul-2002 | 7,049,272 |
| PROCESS FOR INCREMENTAL COATING OF PROPPANTS FOR HYDRAULIC FRACTURING AND PROPPANTS PRODUCED THEREFROM | Fairmount Santrol Inc. | 10/611,200 | 01-Jul-2003 | 7,135,231 |
| PROCESS FOR INCREMENTAL COATING OF PROPPANTS FOR HYDRAULIC FRACTURING AND PROPPANTS PRODUCED THEREFROM | Fairmount Santrol Inc. | 11/582,644 | 18-Oct-2006 | 8,852,682 |
| DEGRADABLE BALL SEALERS AND METHODS FOR USE IN WELL TREATMENT | Fairmount Santrol Inc. | 11/640,813 | 18-Dec-2006 | 7,647,964 |
| COMPOSITION OF MATTER AND METHOD OF APPLICATION FOR ELIMINATION OF HEXAMETHYLENETETRAMINE IN SHELL SAND ENCAPSULATION | Fairmount Santrol Inc. | 11/645,991 | 27-Dec-2006 | 7,763,316 |
| NO HEXA SHELL SAND | Fairmount Santrol Inc. | 12/832,171 | 08-Jul-2010 | 8,754,147 |
| RAPID ACTION COATER | Fairmount Santrol Inc. | 12/914,560 | 28-Oct-2010 | 8,697,185 |
| ENVIRONMENTALLY SAFE PROMOTER FOR USE IN FLOTATION SEPARATION OF CARBONATES FROM MINERALS | Fairmount Santrol Inc. | 11//203,919 | 15-Aug-2005 | 7,275,643 |
| META CROSSLINKED BENZYL POLYMERS | | 15/228,189 | 04-Aug-2016 | N/A |
| PROPPANTS FOR HYDRAULIC FRACTURING TECHNOLOGIES | Self-Suspending Proppant LLC | 12/908,411 | 20-Oct-2010 | N/A |
| PROPPANTS FOR HYDRAULIC FRACTURING TECHNOLOGIES | Self-Suspending Proppant LLC | 15/339,986 | 01-Nov-2016 | N/A |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 13/599,828 | 30-Aug-2012 | 9315721 |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 15/081,037 | 25-Mar-2016 | 9796916 |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 15/721,983 | 02-Oct-2017 | N/A |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 13/838,806 | 15-Mar-2013 | 9297244 |

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| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 15/078,371 | 23-Mar-2016 | N/A |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 15/721,983 | 10-Feb-2017 | N/A |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 14/958,112 | 12-Mar-2015 | 9,644,139 |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 14/197,596 | 05-Mar-2014 | N/A |
| CALCIUM ION TOLERANT SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 14/631,946 | 26-Feb-2015 | N/A |
| HARD WATER RESISTANT SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 15/091,987 | 06-Apr-2016 | N/A |
| SALT-TOLERANT SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 15/595,722 | 15-May-2017 | N/A |
| AMPHOTERIC SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 62/240,611 | 13-Oct-2016 | N/A |
| SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 15/782,066 | 12-Oct-2017 | N/A |
| SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | US17/56287 | 12-Oct-2017 | N/A |
| SELF-SUSPENDING PROPPANTS FOR HYDRAULIC FRACTURING | Self-Suspending Proppant LLC | 15/340,000 | 01-Nov-2016 | N/A |
| SELF-SUSPENDING PROPPANTS | Self-Suspending Proppant LLC | 62/428,258 | 30-Nov-2016 | N/A |
| SELF-SUSPENDING PROPPANT WITH SANDWICHED HYDROGEL COATING | Self-Suspending Proppant LLC | 15/782,922 | 13-Oct-2017 | N/A |
| DEGRADABLE BALL SEALERS WITH IMPROVED SOLUBILITY CHARACTERISTICS | Fairmount Santrol Inc. | 62/396,960 | 20-Sep-2016 | N/A |
| DEGRADABLE BALL SEALERS WITH IMPROVED SOLUBILITY CHARACTERISTICS | Fairmount Santrol Inc. | 15/708,957 | 19-Sep-17 | N/A |
| FLOWBACK RESISTANT PROPPANTS | Fairmount Santrol Inc. | 62/473,677 | 20-Mar-17 | N/A |
| IMPROVED SELF-SUSPENDING PROPPANTS MADE FROM POWDERED HYDROGEL-FORMING POLYMERS | Self-Suspending Proppant LLC | 62/526,614 | 29-Jun-17 | N/A |