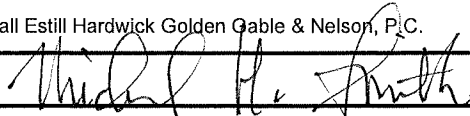
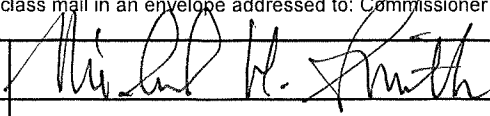


TRANSMITTAL FORM <i>(to be used for all correspondence after initial filing)</i>	Application Number	61/898,107
	Filing Date	10/31/2013
	First Named Inventor	Bryce Conway
	Art Unit	NYA
	Examiner Name	NYA
Total Number of Pages in This Submission	Attorney Docket Number	331299.01662

ENCLOSURES (Check all that apply)		
☐ Fee Transmittal Form ☒ Fee Attached ☐ Amendment/Reply ☐ After Final ☐ Affidavits/declaration(s) ☐ Extension of Time Request ☐ Express Abandonment Request ☐ Information Disclosure Statement ☐ Certified Copy of Priority Document(s) ☐ Reply to Missing Parts/ Incomplete Application ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53	☐ Drawing(s) ☐ Licensing-related Papers ☐ Petition ☐ Petition to Convert to a Provisional Application ☐ Power of Attorney, Revocation ☐ Change of Correspondence Address ☐ Terminal Disclaimer ☐ Request for Refund ☐ CD, Number of CD(s) _____ ☐ Landscape Table on CD	☐ After Allowance Communication to TC ☐ Appeal Communication to Board of Appeals and Interferences ☐ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) ☐ Proprietary Information ☐ Status Letter ☒ Other Enclosure(s) (please Identify below): See Remarks below:
Remarks Electronically transmitted on May 15, 2014: 1. sb21 Transmittal (1 page); 2. Request to Add Inventor (2 pages).		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm Name	Hall Estill Hardwick Golden Gable & Nelson, P.C.		
Signature			
Printed name	Michael H. Smith		
Date	05/15/2014	Reg. No.	53,614

CERTIFICATE OF TRANSMISSION/MAILING			
I hereby certify that this correspondence is being ^{electronically} facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:			
Signature			
Typed or printed name	Michael H. Smith	Date	05/15/2014

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Electronically Filed: May 15, 2014

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Application No.: 61/898,107

Confirmation No. 1876

Filing Date: October 31, 2013

Examiner: NYA

Group No.: NYA

Title: REMEDIATION METHOD FOR SUBTERRANEAN
FORMATIONS, WELLBORES AND SURFACE EQUIPMENT
DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH
RESIDUAL POLYMERS BY USING A CHELATING AGENT

Atty. Dkt. No.: 331299.01662

**REQUEST AND FEE TO ADD ORIGINAL NOT NAMED INVENTOR(S)
IN A PROVISIONAL APPLICATION (37 C.F.R. § 1.48(d))**

1. This amendment and request is to correct the incorrect original naming of inventor(s) in the application under 37 C.F.R. § 1.48(d) as set forth and filed on October 25, 2013.

2. Addition of Inventor(s)

Add the following previously unnamed person(s) as inventor(s) of this application:

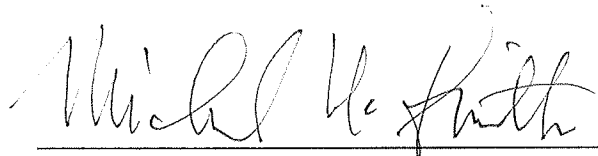
Bob Easterly, residing in Tulsa, Oklahoma, USA

3. Fee Payment (37 C.F.R. § 1.17(q))

The fee required is paid as follows:

Authorization is hereby made to charge the amount of \$50.00 to the credit card, being provided electronically. The Director is authorized to charge any deficiencies and credit any overpayment to Deposit Account No. 506295.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Michael H. Smith", written over a horizontal line.

Michael H. Smith, Reg. No. 53,614
HALL, ESTILL, HARDWICK, GABLE,
GOLDEN & NELSON P.C.
100 North Broadway, Suite 2900
Oklahoma City, OK 73102
Telephone: (405) 553-2828
Facsimile: (405) 553-2855
Attorney for Applicant(s)

Customer No. 72766

Electronic Patent Application Fee Transmittal

Application Number:	61898107			
Filing Date:	31-Oct-2013			
Title of Invention:	REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT			
First Named Inventor/Applicant Name:	Bryce Conway			
Filer:	Michael Hoyt Smith/Janella Rose			
Attorney Docket Number:	331299.01662			
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Processing Fee for Provis. Applications	1807	1	50	50
Total in USD (\$)				50

Electronic Acknowledgement Receipt

EFS ID:	19043077
Application Number:	61898107
International Application Number:	
Confirmation Number:	1876
Title of Invention:	REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT
First Named Inventor/Applicant Name:	Bryce Conway
Customer Number:	72766
Filer:	Michael Hoyt Smith/Janella Rose
Filer Authorized By:	Michael Hoyt Smith
Attorney Docket Number:	331299.01662
Receipt Date:	15-MAY-2014
Filing Date:	31-OCT-2013
Time Stamp:	16:40:47
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$50
RAM confirmation Number	3309
Deposit Account	506295
Authorized User	ROSE, JANELLA

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	331299-01662_sb21_Transmittal.pdf	78626 f7feb439de135f36f67e394fbb126c31286859ce	no	1
Warnings:					
Information:					
2	Miscellaneous Incoming Letter	331299-01662_Request_Add_Inventor.pdf	62240 b6235fdf8239de336bde43a0b69d4cfd42a0890	no	2
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30659 1966ef532172081b279b5e2cfec073e4ecddeb37b	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			171525		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
61/898,107	10/31/2013		130	331299.01662		

CONFIRMATION NO. 1876

72766

Hall Estill Hardwick Gable Golden & Nelson, P.C.
100 North Broadway
Suite 2900
Oklahoma City, OK 73102

FILING RECEIPT



Date Mailed: 11/13/2013

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Bryce Conway, Weatherford, OK;

Applicant(s)

Bryce Conway, Weatherford, OK;

Power of Attorney:

Michael Smith--53614

If Required, Foreign Filing License Granted: 11/08/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/898,107**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

REMEDIATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at <http://www.uspto.gov/web/offices/pac/doc/general/index.html>.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, <http://www.stopfakes.gov>. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 1 of 2

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express-Mail Label No. _____ Electronically Transmitted: 10/31/2013

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Bryce	Conway	Weatherford, OK
Additional inventors are being named on the _____ separately numbered sheets attached hereto.		
TITLE OF THE INVENTION (500 characters max):		
REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT		
Direct all correspondence to: CORRESPONDENCE ADDRESS		
☒ The address corresponding to Customer Number: 72766		
OR		
☐ Firm or Individual Name		
Address		
City	State	Zip
Country	Telephone	Email
ENCLOSED APPLICATION PARTS (check all that apply)		
☐ Application Data Sheet. See 37 CFR 1.76. ☐ CD(s), Number of CDs _____		
☐ Drawing(s) Number of Sheets _____ ☐ Other (specify) _____		
☒ Specification (e.g., description of the invention) Number of Pages <u>13</u>		
Fees Due: Filing Fee of \$260 (\$130 for small entity) (\$65 for micro entity). If the specification and drawings exceed 100 sheets of paper, an application size fee is also due, which is \$400 (\$200 for small entity) (\$100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).		
METHOD OF PAYMENT OF THE FILING FEE AND APPLICATION SIZE FEE FOR THIS PROVISIONAL APPLICATION FOR PATENT		
☒ Applicant asserts small entity status. See 37 CFR 1.27.		
☐ Applicant certifies micro entity status. See 37 CFR 1.29. Applicant must attach form PTO/SB/15A or B or equivalent.		
☐ A check or money order made payable to the <i>Director of the United States Patent and Trademark Office</i> is enclosed to cover the filing fee and application size fee (if applicable).		
☒ Payment by credit card. Form PTO-2038 is attached.		
☐ The Director is hereby authorized to charge the filing fee and application size fee (if applicable) or credit any overpayment to Deposit Account Number: _____		
130.00 TOTAL FEE AMOUNT (\$)		

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET – Page 2 of 2

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

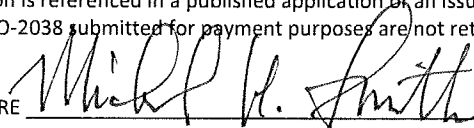
☐ Yes, the invention was made by an agency of the U.S. Government. The U.S. Government agency name is: _____

☐ Yes, the invention was made under a contract with an agency of the U.S. Government. The name of the U.S. Government agency and Government contract number are: _____

WARNING:

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SIGNATURE



DATE 10/31/2013

TYPED OR PRINTED NAME

Michael H. Smith

REGISTRATION NO. 53,614
(if appropriate)

TELEPHONE 405.553.2803

DOCKET NUMBER 331299.01662

**REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS,
WELLBORES AND SURFACE EQUIPMENT DAMAGED
OR OBSTRUCTED BY METAL COMPLEXES WITH
RESIDUAL POLYMERS BY USING A CHELATING AGENT**

[0001] Various embodiments disclosed herein are generally directed to a method of remediation of providing a chelating agent into a subterranean formation wellbore, and/or surface equipment damaged or obstructed by metal complexes with residual polymers.

[0002] The present disclosure relates to a process to sequester and remediate insoluble metal and polymer complexes formed in a subterranean formation, well bore and/or surface equipment following the introduction of a hydraulic fracturing fluid containing a polymer, for example, polyacrylamide friction reduction polymers. An insoluble metal complex, such as, for example, ferric hydroxide, is solubilized using, for example, one or a combination of the following chelation chemicals (chelating agent): Acetic Acid, Acrylates, Dihydroxymaleic Acid, Salts of Dihydroxymaleic Acid, EDTA (ethylenediamine tetraacetic acid), Salts of EDTA, erythorbic acid, erythroboric acid, Formic Acid, Gluconodeltalactone, GLDA (glutamic acid N,N-diacetic acid), Salts of GLDA, HEDTA (hydroxyethylenediamine triacetic acid), Salts of HEDTA, HEIDA (disodium ethanoldiglycine), Salts of HEIDA, MGDA (methylglycine N,N-diacetic acid), Salts of MGDA, NTA (nitriolotriacetic acid), Organic Metal Complexers, Phosphonic Acid,

Polyacrylic Acid and notably Citric Acid in an amount sufficient to sequester at least a portion of any metal compounds that may coagulate or complex the polymer, such as removing Fe^{+2} or Fe^{+3} iron from an iron coagulated polyacrylamide mass. It should be understood that although chelation chemical(s) (chelating agent(s), chelator(s)) have been provided herein by way of example, any chelation chemical may be utilized in accordance with the present process, so long as the chelation chemical functions in accordance with the present disclosure as described herein.

[0003] In one embodiment, the chelating agent is provided between about 0.05% weight volume to about 60% weight volume. However, it should be understood that the amount of chelating agent provided will vary depending upon various parameters and conditions. In one embodiment, the chelater is simply pumped into the wellbore as a concentrated solution, allowed to extract the metal and chelate it so that it no longer binds the polymer, and the dispersed polymer is then flowed from the well bore. Other methods of contacting the chelating agent with coagulated polymer may include pumping the chelater solution through coiled tubing, a "work string" or capillary line. The chelating agent may also be pumped through surface equipment, such as production units, heater treaters, separators, flow lines and the like. Contact time and method will be adjusted based on concentration of the chelater solution and metal content of the material to be removed.

[0004] In order to further illustrate various embodiments of the present invention, the following examples are given. However, it is to be understood that the examples are for illustrative purposes only and are not to be construed as limiting the scope of the subject invention.

Examples

Example 1

Purpose

The purpose of this project was to determine the physical/chemical changes/interactions of the submitted unknown gel sample with the following remediation chemicals:

- 10% OX-204
- 10% tetrasodium EDTA
- P-SOLV

The Objective

The objective is to optimize the removal of downhole gel residue deposits by achieving the following goals:

Gel/polymer identification

Gel/polymer treatment

Procedure

The initial qualitative tests performed on the unknown gel was accomplished by running three initial solubility tests. In this experiment, it is assumed that the

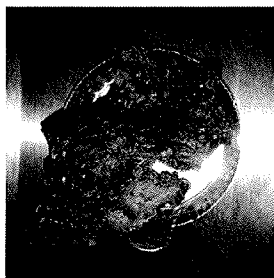
submitted unknown gel/polymer sample is a ferric hydroxide/polyacrylamide derivative. If this assumption is true:

- 10% tetrasodium EDTA is known to solubilize ferric hydroxide into solution.
- 10% citric acid is known to solubilize ferric hydroxide into solution.
- 10% OX-204 is known to break fluids viscosified with synthetic polymers consisting of polyacrylamides, copolymers of polyacrylamide or derivatives of polyacrylamide.

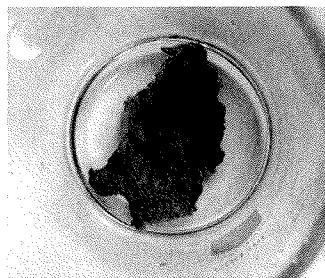
Test 1 – P-SOLV/10% OX-204/10% Tetrasodium EDTA

Procedure

1. 14.2 grams of Unknown Gel Sample was weighed out (Pic. 1).
2. Sample was put into 500 ml Griffin Beaker (Pic. 2) with 8 ml P-SOLV and 40 ml of 10% OX-204.
3. Sample was then placed in 150°F water bath for 16 hours.
4. Sample was observed for viscosity reduction (Pic. 3).
5. After 16 hour observation, 5 ml of 10% tetrasodium EDTA was added and allowed to soak in the water bath @150°F for an additional 6 hours and examined for physical changes (Pic. 4).



Pic.1



Pic.2



Pic. 3

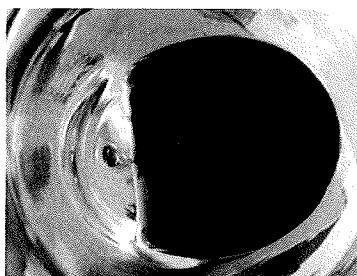


Pic. 4

Test 2 – 10% Tetrasodium EDTA

Procedure

1. 18.7 grams of Unknown Gel Sample was weighed out.
2. Sample was put into 300 ml Griffin Beaker with 40 ml 10% tetrasodium EDTA.
3. Sample was then placed in 150°F water bath for 16 hours.
4. After 16 hours, sample was observed for physical changes (Pic. 5).

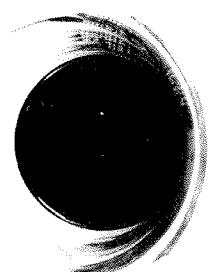


Pic. 5

Test 3 – 10% Citric Acid

Procedure

1. 14.4 grams of Unknown Gel Sample was weighed out.
2. Sample was put into 300 ml Griffin Beaker with 80 ml 10% citric acid.
3. Sample was then placed in 150°F water bath for 16 hours.
4. After 16 hours, sample was observed for physical changes (Pic. 6&7).



Pic. 6



Pic. 7

Results and Discussion

Test 1 – P-SOLV/10% OX-204/10% Tetrasodium EDTA

P-SOLV is a biodegradable terpene based solvent used to remove paraffin deposits. The initial P-SOLV treatment appeared to release a trace amount of hydrocarbon caught up in the gel residue sample. There did appear to be a trace overall change, however, to the gel sample in its entirety after the sample was allowed to soak for 16 hours in 10% OX-204 at 150°F (Pic. 3). After the addition of the 5 ml of 10% tetrasodium EDTA there was a more noticeable, more moderate change in the physical gel structure. The gel sample appeared to decrease in size by 30-40% (Pic. 4).

Test 2 – 10% Tetrasodium EDTA

Tetrasodium EDTA is a polyamino carboxylic acid widely used as a chelating agent for its ability to sequester Ca^{2+} and Fe^{3+} . After being bound by tetrasodium EDTA, metal ions remain in solution but exhibit diminished reactivity. The addition of tetrasodium EDTA to the gel sample completely put the unknown gel sample into solution after 4 hours at 150°F (Pic. 5). It is a hypothesis the gel sample could be an iron-crosslinked polyacrylamide derivative. With the addition of tetrasodium EDTA, it is possible the unknown gel sample is undergoing ion exchange with the tetrasodium EDTA causing it to dissociate and dissolve.

Test 3 – 10% Citric Acid

Citric acid is a weak organic acid that is also used as a chelating agent. The addition of 10% citric acid to the unknown gel sample moderately put the unknown gel sample into solution after 16 hours at 150°F (Pic. 6&7).

Example 2

Purpose

The purpose of this project was to determine the physical/chemical changes/interactions of the submitted unknown gel sample with the following remediation chemicals:

- 10% Citric Acid
- 10% Tetrasodium EDTA
- 5% Citric Acid/5% Tetrasodium EDTA Solution

The Objective

Our objective is to optimize the removal of downhole lateral gel residue deposits by achieving the following goals:

- Gel/polymer derivative identification
- Gel/polymer derivative treatment

Procedure

The initial qualitative tests performed on the unknown gel was accomplished by running two initial solubility tests. In this experiment, it is assumed that the submitted unknown gel/polymer sample is a ferric hydroxide/polyacrylamide derivative. If this assumption is true:

- 10% tetrasodium EDTA is known to solubilize ferric hydroxide into solution.
- 10% citric acid is known to solubilize ferric hydroxide into solution.

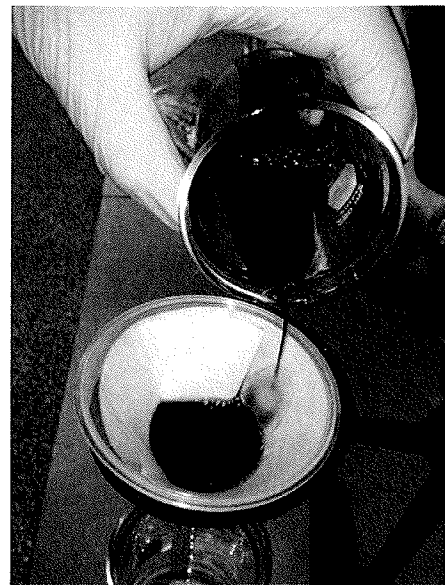
Test 1 – 10% Citric Acid

Procedure

1. 21.6 grams of Unknown Gel Sample was weighed out (Pic. 1).
2. Sample was put into 250 ml Griffin Beaker with 40 ml of 10% Citric Acid.
3. Sample was then placed in 178°F water bath for 18 hours.
4. Sample was filtered and observed for viscosity reduction (Pic. 2).



Pic. 1



Pic. 2

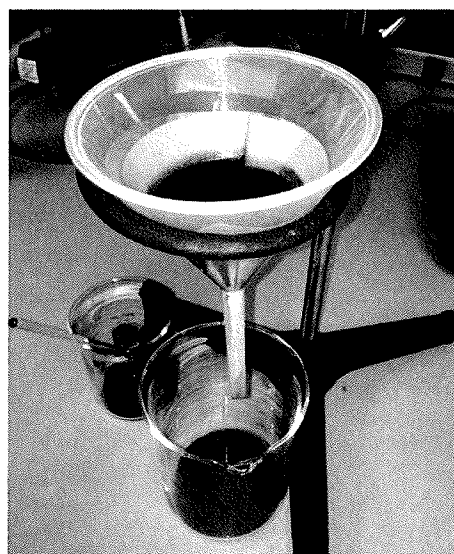
Test 2 – 10% Tetrasodium EDTA

Procedure

1. 21.6 grams of Unknown Gel Sample was weighed out (Pic. 3).
2. Sample was put into 250 ml Griffin Beaker with 40 ml of 10% Tetrasodium EDTA.
3. Sample was then placed in 178°F water bath for 18 hours.
4. Sample was filtered and observed for viscosity reduction (Pic. 4).



Pic. 3



Pic. 4

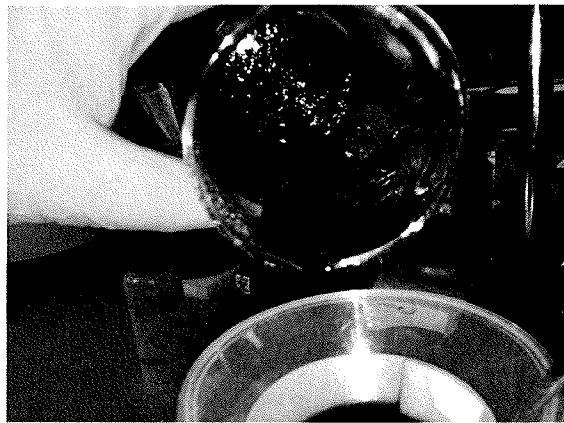
Test 3 – 5% Citric Acid/5% Tetrasodium EDTA Solution

Procedure

1. 21.6 grams of Unknown Gel Sample was weighed out (Pic. 5).
2. Sample was put into 250 ml Griffin Beaker with 40 ml of 5% Citric Acid/5% Tetrasodium EDTA Solution.
3. Sample was then placed in 178°F water bath for 18 hours.
4. Sample was filtered and observed for viscosity reduction (Pic. 4).



Pic. 5



Pic. 6

Results and Discussion

Test 1 – 10% Citric Acid

[0005] Citric acid is a weak organic acid that is also used as a chelating agent. The addition of 10% citric acid to the unknown gel sample moderately put the unknown gel sample into solution after 18 hours at 178°F (Pic. 2). Filtrate and frac sand appeared to have no binding polymer residue.

Test 2 – 10% Tetrasodium EDTA

[0006] Tetrasodium EDTA is a polyamino carboxylic acid widely used as a chelating agent for its ability to sequester Ca^{2+} and Fe^{3+} . After being bound by tetrasodium EDTA, metal ions remain in solution but exhibit diminished reactivity. The addition of tetrasodium EDTA to the gel sample moderately put the unknown gel sample into solution after 16 hours at 178°F (Pic. 4). It is a hypothesis the gel sample could be an iron-crosslinked polyacrylamide derivative. With the addition of tetrasodium EDTA, it is possible the unknown gel sample is undergoing ion exchange with the tetrasodium EDTA causing it to dissociate and dissolve. Filtrate and remaining frac sand in the sample broke out but had a polymer binding sludge-coated appearance.

Test 3 – 5% Citric Acid/5% Tetrasodium EDTA Solution

[0007] The addition of 5% citric acid/5% Tetrasodium EDTA Solution to the unknown gel sample moderately put the unknown gel sample into solution after 18 hours at 178°F (Pic. 6). Filtrate and remaining frac sand in the sample broke out but had a polymer binding sludge-coated appearance.

Conclusion

[0008] The 10% Citric Acid Solution appeared to have the best viscosity reduction of the submitted polymer solid sample. The EDTA did not perform as well as the 10% Citric Acid.

[0009] From the above description, it is clear that the present invention is well adapted to carry out the objects and to attain the advantages mentioned herein as well as those inherent in the invention. While presently preferred embodiments of the invention have been described for purposes of this disclosure, it will be understood that numerous changes may be made which will readily suggest themselves to those skilled in the art and which are accomplished within the spirit of the invention disclosed.

What is claimed is:

1. A method for remediating a subterranean formation, wellbore or surface equipment, comprising the step:

providing a chelating agent into a subterranean formation, wellbore or surface equipment.

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT			
First Named Inventor/Applicant Name:	Bryce Conway			
Filer:	Michael Hoyt Smith/Janella Rose			
Attorney Docket Number:	331299.01662			
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional Application Filing Fee	2005	1	130	130
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

PHARAOAH, EX. 1009

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				130

Electronic Acknowledgement Receipt

EFS ID:	17282373
Application Number:	61898107
International Application Number:	
Confirmation Number:	1876
Title of Invention:	REMEDICATION METHOD FOR SUBTERRANEAN FORMATIONS, WELLBORES AND SURFACE EQUIPMENT DAMAGED OR OBSTRUCTED BY METAL COMPLEXES WITH RESIDUAL POLYMERS BY USING A CHELATING AGENT
First Named Inventor/Applicant Name:	Bryce Conway
Customer Number:	72766
Filer:	Michael Hoyt Smith/Janella Rose
Filer Authorized By:	Michael Hoyt Smith
Attorney Docket Number:	331299.01662
Receipt Date:	31-OCT-2013
Filing Date:	
Time Stamp:	15:43:50
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$130
RAM confirmation Number	2588
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part File	Pages If applicable
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1	Transmittal of New Application	331299-01662_sb16_Transmittal.pdf	111066 ef01e9e11804fc6b5b528d8a3a74288097eba704	no	2
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Information:					
2		331299-01662_Application.pdf	988351 42589f8bd99a3cc4655270b8f268cafd19602d3	yes	13
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	12	
	Claims		13	13	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	30205 5d1aa81bc3c14ed6659e13d8e923ee69652f6678	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			1129622		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					