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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: 04/14/2014

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):

 METHOD FOR STIMULATING OR REMEDIATING BY USE OF 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>21</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: <u>506295</u> .	130.00 TOTAL FEE AMOUNT (\$)
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USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

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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: _____
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SIGNATURE Michael H. Smith DATE 04/14/2014
TYPED OR PRINTED NAME Michael H. Smith REGISTRATION NO. 53,614
(if appropriate)
TELEPHONE 405.553.2803 DOCKET NUMBER 331299.01663

**METHOD FOR STIMULATING OR REMEDIATING
BY USE OF A CHELATING AGENT**

[0001] Various embodiments disclosed herein are generally directed to a method of stimulation and/or remediation by providing a chelating agent into a subterranean formation wellbore, and/or surface equipment to solubilize metal complexes with hydroxides, sulfur bearing ions, or silicon bearing ions that form solid or partially solid materials in the formation and thereby restrict flow.

[0002] The present disclosure relates to a process to sequester and recover metal ions from partially soluble metallic ion complexes naturally present in or formed in a subterranean formation or in surface equipment through interaction with drilling, completion, or stimulation fluids. Whether the metallic ions are present from natural sources in the reservoir rock prior to drilling into the formation or formed through interactions with drilling, completion, or reservoir stimulation (hydraulic fracturing or acid stimulation) fluids, the use of metal chelating substances to dissolve or disperse materials that are, or can, restrict flow into the well bore is presented as a commercial method to restore or enhance the productivity of well bores that are restricted with such materials. For example, the introduction of hydraulic fracturing fluids and/or acid treatments that release metal ions through their interaction with the formation materials, such as aluminum,

barium, calcium, magnesium, manganese, iron, strontium, boron and other metals or metalloids. Such metallic or metalloid ions may form ion complexes with sulfur bearing ions such as sulfide and sulfate, hydroxide ions, and silicon bearing ions such as silicates; for example calcium magnesium silicate, that may precipitate or otherwise form flow restrictions in the porous space of the reservoir rock in the well bore. Specifically, metallic ion complexes such as aluminum hydroxide, aluminum silicate, calcium hydroxide, calcium magnesium silicate, iron hydroxide, iron silicate, magnesium hydroxide, magnesium silicate, or other metal hydroxide, and/or silicon complexes, or metal sulfide or metal sulfate scales; that through formation of solid or colloidal substances may form restrictions that limit the permeability of reservoir rock to producing hydrocarbons. A partially soluble or colloidal metal ion complex, such as, for example, calcium magnesium silicate, 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 and there by dissolve or disperse materials that can restrict the flow path to the well bore and the overall permeability of the well bore and reservoir rock system. 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 addition, the use of various other chemicals to enhance the recovery (flow back) of solubilized/dispersed materials from the well when chelating chemicals are used to enhance well productivity, such as mineral acids, corrosion inhibitors, surfactants, scale inhibitors, dispersing agents, biocide materials to control biologic growth or introduction to the well bore, sodium hydroxide, etc.

[0004] 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 chelator is simply pumped into the wellbore as a concentrated solution with or without a diverting agent, allowed to extract the metal and chelate it so that colloidal silicate compounds are then flowed from the well bore. Other methods of contacting the chelating agent with insoluble or partially

soluble flow restricting agents may include pumping the chelator solution through coiled tubing, a "work string", or a 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 chelator solution and metal content of the material to be removed.

[0005] An example of well flow back profile from a citric acid treatment with additives from a horizontal well completed in the Woodford Shale is attached hereto; including: (1) multiple samples of fluid and data of samples; (2) plot of iron and pH vs. time; (3) plot of calcium, magnesium and pH vs. time; and (4) plot of aluminum, barium, manganese, strontium, sulfate; and pH vs. time. It should be understood that changes may be made in the operation and the setup of the present disclosure. The attached materials are incorporated herein by reference.

[0006] In another embodiment, the chelator solution is mixed with one or more other chemicals to assist with recovery (flow back) of the dissolved/dispersed materials after the metals ions are chelated, such as mutual solvents, scale inhibitors, corrosion inhibitors, surfactants, biocidal agents, dispersing agents, caustic materials to raise pH, and/or mineral acids to enhance pH reduction. Such materials could assist with removing/recovering dissolved or dispersed materials from the well bore either when flowing with natural pressure or through swabbing or some

other mechanism to mechanically lift the spent chelator solution and chemical materials from the well.

[0007] Diverting agents such as benzoic acid flakes, polylactic acid, solid or water soluble ball sealers, rock salt, encapsulated solid chelators, etc., other diverting agents.

[0008] Mutual solvents would include compounds such as ethylene glycol monobutyl ether or FCS-280 or other compounds commonly used for such applications in well maintenance activities

[0009] Scale inhibitors would include such materials as phosphate, phosphate ester, or phosphonate compounds; polymaleic, or acrylate compounds such as poly acrylic acid scale inhibitors commonly used for such applications in well maintenance activities...(reference SPE paper number 81825, 84958, 14115, 113261, etc.). The attached materials are incorporated herein by reference.

[0010] Corrosion inhibitors would include quaternary amine compounds commonly used for protection of metal in the presence of high or low pH and/or dissolved oxygen bearing fluids, such as Flex Chem FC-181 and many other similar formulations used in well maintenance activities.

[0011] Surfactants such as sodium lauryl sulfate and many other surfactant materials that could be selected based on their compatibility with the other materials in the chelating solution and pH of the final solution.

[0012] Biocidal agents could include, glutaraldehyde, quaternary amine compounds such as ADBAC, sodium chlorite (which would generate chlorine dioxide in-situ), TTPC, isothiazolin compounds, thione based compounds, and many other agents approved for use in the well maintenance activities.

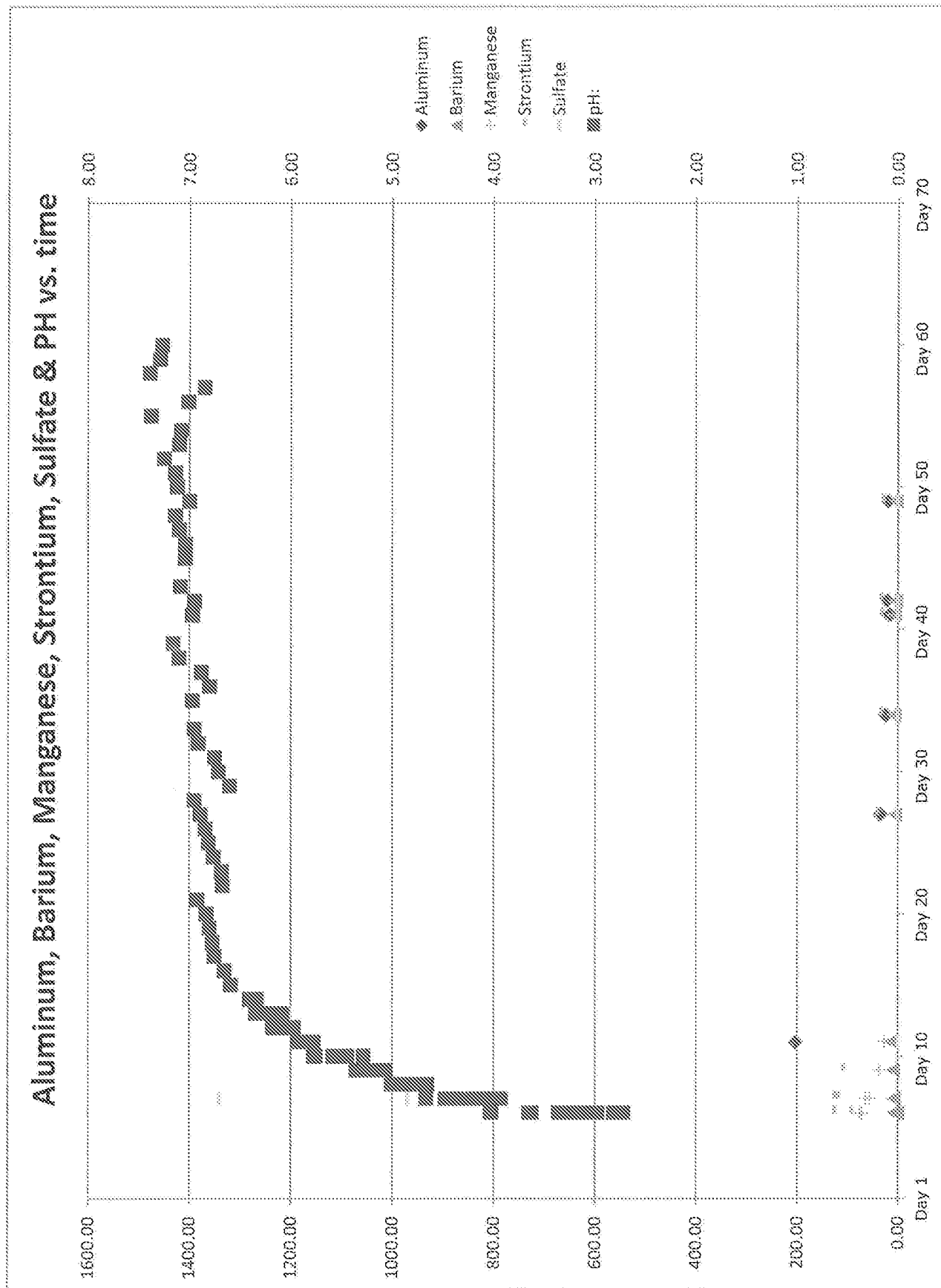
[0013] Dispersing agents such as Dow Acumer 5000 or Versaflex SI to enhance the removal of colloidal silicon bearing materials and many other dispersing agents that could assist with recovering colloidal material residue from the well bore.

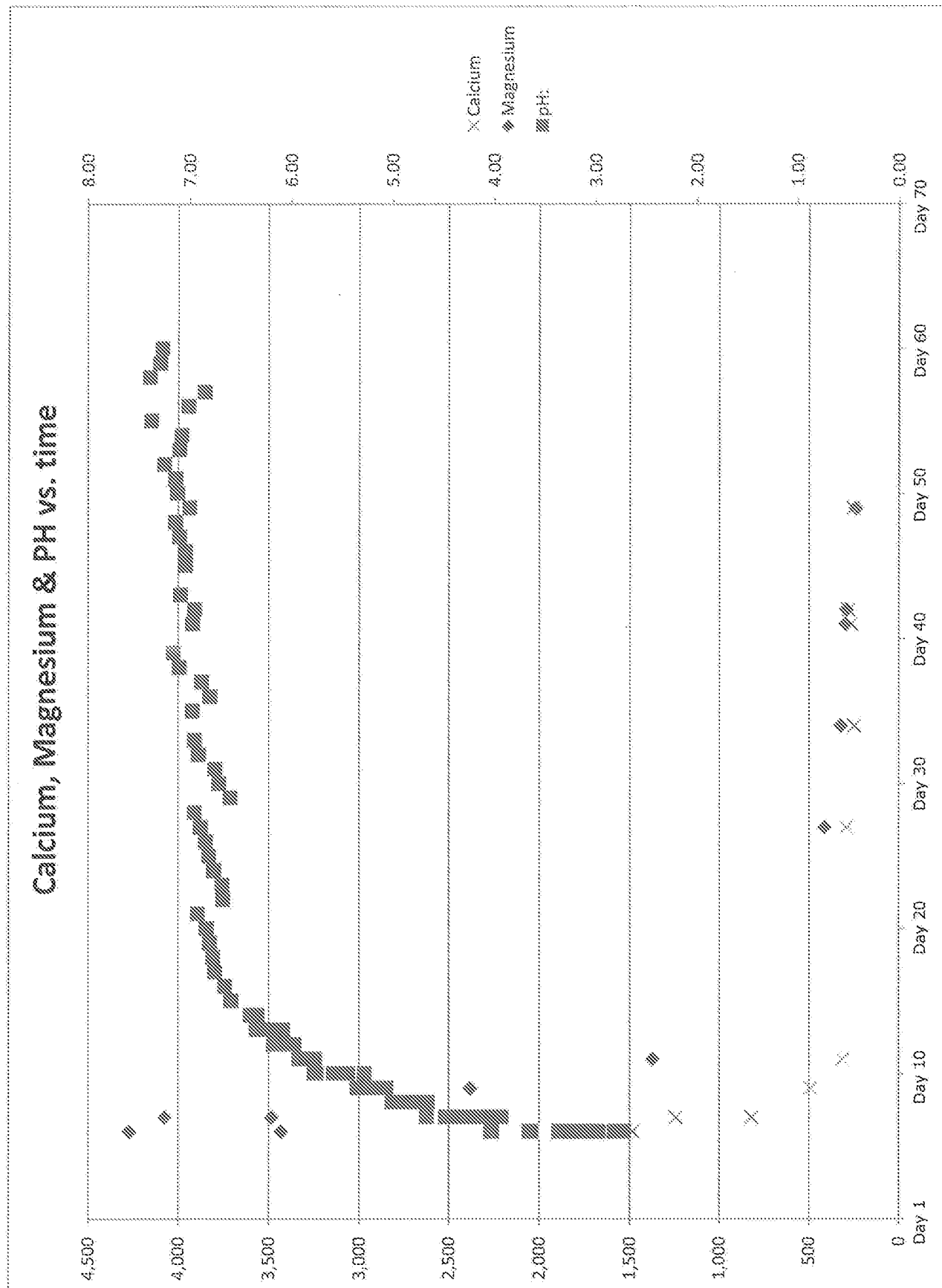
[0014] From the above description, it is clear that the present invention is well adapted to carry out the objects and to attain the advantages mentioned herein as well as those inherent in the invention. While presently preferred embodiments of the invention have been described for purposes of this 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:

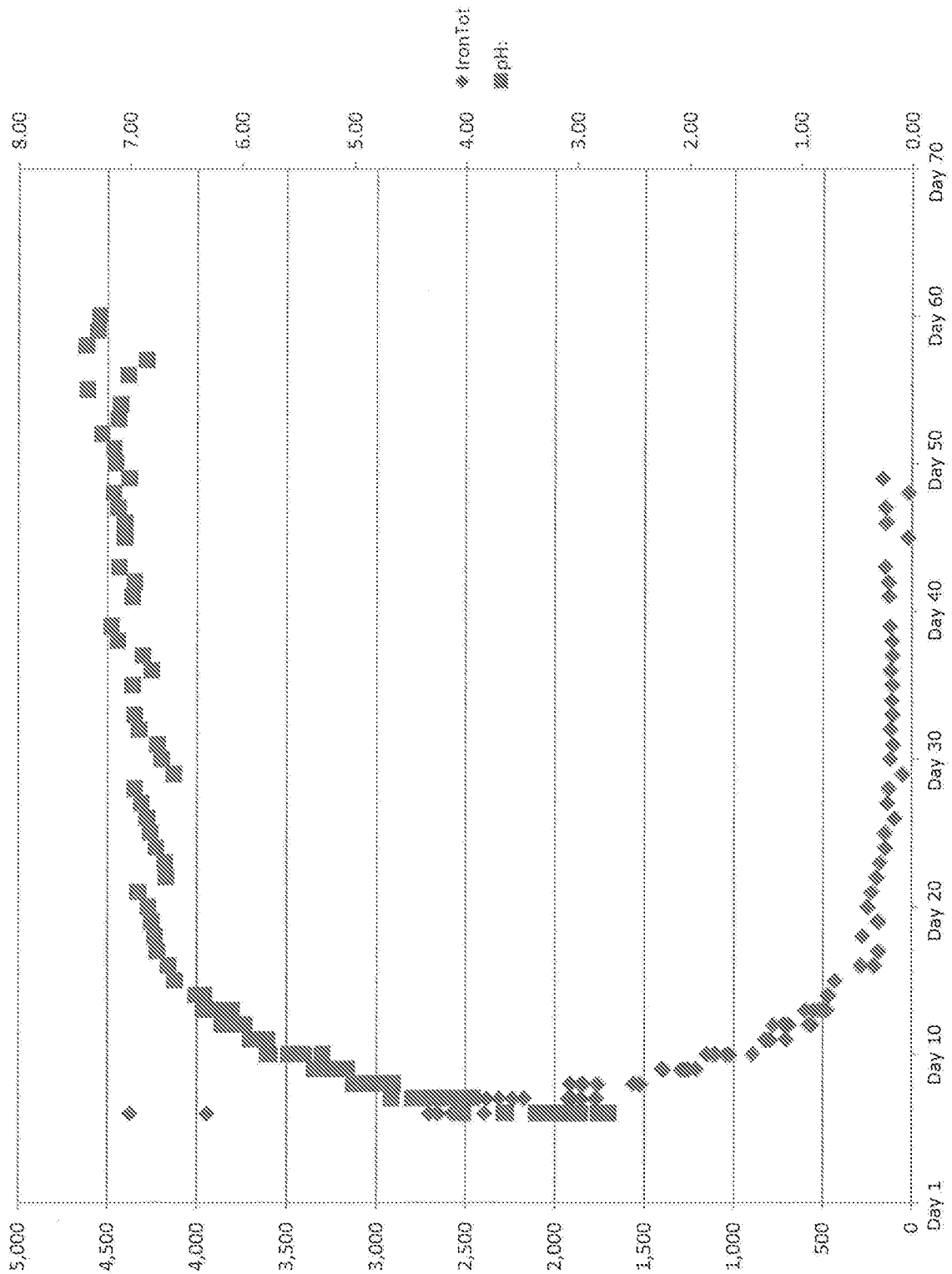
1. A method for stimulating or remediating a subterranean formation, wellbore or surface equipment, comprising the step:

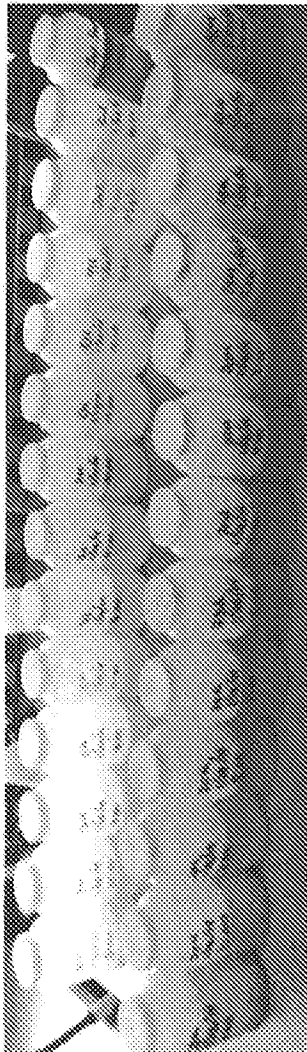
providing a chelating agent into a subterranean formation, wellbore or surface equipment.
2. A method for stimulating or enhancing the flowing potential of wells that contain minerals that are dissolved or dispersed in the presence of acidic or caustic chelating compounds.





Iron & pH vs. time





Sample #	pH	Sp. Gr.	Rw	Cl/C	Aluminum	Arsenic	Barium	Boron	Calcium	Iron/Fe	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Strontium	Chloride	Sulfate	Orthophosphate	Phosphorus
	Condensate	Condensate	Ohm-M	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	Tot
1				57.5																
2	3.30	1.0770		-						4.370										
3	2.81	1.0892		105.0																
4	2.72	1.0857		-																
5	2.97	1.0781	0.172	137.5					1.480	3.940	790	3.430	75.1		17.300	91.4	23.500	713	<4.00	<0.750
6	3.09	1.0762	0.160	-						2.570										
7	3.22	1.0750	0.160	62.5																
8	3.29	1.0741	0.160	-						2.680										
9	3.36	1.0737	0.161	45.0																
10	3.63	1.0697	0.161	-						2.550										
11	3.63	1.0695	0.160	37.5																
12	3.65	1.0697	0.161	-						2.650										
13	3.65	1.0698	0.160	50.0																
14	3.65	1.0700	0.160	-					1.550	2.700	807	4.270	70.2		19.500	124	27.700	681	<4.00	<0.750
15	3.65	1.0692	0.160	60.0																
16	4.02	1.0621	0.161	-						2.390										
17	4.03	1.0620	0.161	70.0																
18	4.02	1.0636	0.161	-						2.640										
19	4.02	1.0624	0.161	65.0																
20	4.03	1.0621	0.162	-						2.310										
21	3.95	1.0632	0.165	55.0																

Sample #:	pH	Sp. Gr.	Re.	QAC	Aluminum	Arsenic	Barium	Boron	Calcium	Iron/Fe	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Strontium	Chloride	Sulfate	orthophosphate as P	Phosphorous Tot
22	5.98	1.0675	0.168	-						2,500										
23	4.08	1.0617	0.170	47.5																
24	4.09	1.0616	0.170	-			6.68		1,240	2,380	803	4,070	62.8		18,900	124	26,200	1,390	<4.00	<0.750
25	4.08	1.0613	0.173	55.0																
26	4.12	1.0609	0.177	-						2,170										
27	4.14	1.0604	0.177	60.0																
28	4.19	1.0601	0.178	-						2,230										
29	4.27	1.0605	0.179	55.0																
30	4.26	1.0580	0.179	-						1,900										
31	4.33	1.0586	0.180	80.0																
32	4.33	1.0586	0.180	-						1,910										
33	4.34	1.0575	0.180	-																
34	4.41	1.0573	0.181	-						1,850										
35	4.41	1.0570	0.181	-						1,770										
36	4.47	1.0556	0.187	-			7.43		818	1,970	704	3,480	54.0		20,400	117	24,100	969	<4.00	<0.750
37	4.55	1.0525	0.194	-						1,850										
38	4.85	1.0525	0.198	-						1,910										
39	4.77	1.0512	0.204	-						1,840										
40	4.83	1.0496	0.211	-						1,760										
41	4.86	1.0465	0.199	-						1,560										
42	4.94	1.0450	0.208	-						1,520										
43	5.00	1.0457	0.240	-						1,350										
44	5.06	1.0435	0.238	-						1,400										
45	5.13	1.0425	0.241	-						1,290										
46	5.17	1.0410	0.235	-			8.69		437	1,210	574	2,380	35.4		16,000	107	19,200	1,070	<4.00	<0.750
47	5.17	1.0410	0.239	120.0						1,270										
48	5.23	1.0413	0.231	90.0						1,250										
49	5.35	1.0388	0.242	77.5						1,150										
50	5.28	1.0382	0.232	85.0						1,040										
51	5.44	1.0365	0.238	80.0						1,110										
52	5.52	1.0349	0.240	85.0						1,100										
53	5.58	1.0347	0.245	90.0						1,020										
54	5.77	1.0314	0.236	100.5						894										
55	5.75	1.0323	0.258	61.5						793										
56	5.77	1.0324	0.259	75.0						613										

Sample #.	ph	Sp. Gr.	Pw.	Cl/C	Aluminum	Arsenic	Barium	Boron	Calcium	Iron/Tot	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Strontium	Chloride	Sulfate	orthophosphate as P	Phosphorous Tot
			Qm-Md	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
57	5.78	1.0316	0.260	82.5						819										
58	5.88	1.0310	0.262	85.0						815										
59	5.83	1.0304	0.271	82.5						820										
60	5.89	1.0296	0.278	85.0	202		12.80		308	705	455	1.370	25.9		9.680	<2.50	14,600	<300		
61	5.92	1.0290	0.277	82.5						775										
62	5.97	1.0285	0.282	87.5						717										
63	6.01	1.0281	0.295	80.0						688										
64	6.02	1.0274	0.295	47.5						710										
65	6.08	1.0282	0.282	37.5						558										
66	6.06	1.0280	0.280	7.5						575										
67	6.17	1.0282	0.364	7.5						542										
68	6.08	1.0265	0.301	5.0						594										
69	6.13	1.0262	0.301	10.0						473										
70	6.17	1.0270	0.300	5.0						518										
71	6.21	1.0259	0.300	2.5						494										
72	6.27	1.0255	0.300	10.0						473										
73	6.34	1.0250	0.308	15.0						461										
74	6.33	1.0250	0.300	12.5						489										
75	6.40	1.0248	0.314	7.5						437										
76	6.59	1.0234	0.321	2.5						384										
77	6.80	1.0218	0.312	12.8						209										
78	6.65	1.0202	0.321	9.8						182										
79	6.75	1.0194	0.340	10.1						274										
80	6.77	1.0190	0.340	9.2						184										
81	6.80	1.0187	0.358	2.7						243										
82	6.83	1.0185	0.359	4.6						222										
83	6.92	1.0178	0.362	8.4						192										
84	6.67	1.0175	0.370	7.3						175										
85	6.68	1.0170	0.370	9.7						146										
86	6.76	1.0166	0.371	4.6						148										
87	6.81	1.0162	0.368	6.7						91.2										

PHARAOH, EX. 1007

Sample #	pH	Sp. Gr.	Rw	QAC	Aluminum	Arsenic	Barium	Boron	Calcium	Iron/Tot	Potassium	Magnesium	Manganese	Molybdenum	Sodium	Strontium	Chloride	Sulfate	orthophosphate as P	Phosphorus Tot
88	6.84	1.0160	0.430	5.8	34.1	<0.100	5.20	130	288	135	293	411	4.80	0.310	6,320	39.4	-	-	<4.00	1.50
89	6.89	1.0160	0.420	6.9						129										
90	6.95	1.0154	0.430	4.3						48.9										
91	6.80	1.0155	0.420	14.2						120										
92	6.71	1.0150	0.410	12.8						102										
93	6.75	1.0149	0.420	16.9						119										
94	6.81	1.0200	0.430	13.0						108										
95	6.95	1.0245	0.419	12.7	23.0	0.566	8.83	126	246	110	236	323	3.96	<0.500	5,530	32.4	7,700	<300	-	-
96	6.97	1.0150	0.421	16.3																
97	6.97	1.0140	0.420	14.4						109										
98	6.80	1.0139	0.421	16.2						119										
99	6.88	1.0095	0.520	15.4						109										
100	7.10	1.0105	0.599	11.1						107										
101	7.16	1.0131	0.450	9.5	35.8	<0.500	6.25	<250	264	127	222	295	3.85	<0.500	4,261	31.3	6,950	<300	-	-
102	6.97	1.0130	0.440	6.7	20.6	<0.100	4.20	143	283	127	275	291	3.59	0.160	5,790	32.2	-	<4.00	0.800	0.800
103	6.95	1.0129	0.441	5.3						148										
104	7.09	1.0130	0.480	5.1						17.6										
105	7.04	1.0150	0.460	6.5						142										
106	7.04	1.0330	0.460	5.2						147										
107	7.10	1.0300	0.460	10.6						16.9										
108	7.14	1.0121	0.460	8.4	17.8	<0.100	3.20	136	252	162	270	238	3.50	0.110	5,010	28.7	-	<4.00	<0.750	<0.750
109	7.00	1.0129	0.380	9.6																
110	7.12	1.0130	0.430	5.5																
111	7.14	1.0129	0.420	6.2																
112	7.25	1.0131	0.450	5.1																
113	7.10	1.0130	0.440	7.2																
114	7.08	1.0120	0.430	6.3																
115	7.38	1.0139	0.471	15.4																
116	7.01	1.0139	0.470	20.7																
117	6.85	1.0130	0.450	19.7																
118	7.39	1.0331	0.425	3.9																
119	7.29	1.0130	0.430	2.4																
120	7.27	1.0130	0.420	10.1																



BSC™ 8809

Scale inhibitor for reverse osmosis membranes



Certified to NSF/ANSI Standard 60

- NSF Standard 60 certification
- Especially effective in stressed waters
- Controls both calcium carbonate and sulfate
- For use on thin films and cellulose acetates

BSC 8809 is a combination scale inhibitor package that is effective in preventing the precipitation of dissolved solids on the membrane surface. The product also includes a dispersant to aid in flushing contaminants and foulants from the membrane and feedwater spacer surfaces.

BSC 8809 is specifically designed to control the precipitation of calcium carbonate and calcium sulfate in stressful situations. It is also effective in controlling barium sulfate and strontium sulfate scales.

BSC 8809 is a nonphosphate, nonphosphonate inhibitor package that prevents problems that may be encountered with calcium phosphate precipitation. It is also extremely effective in dispersing dissolved alum in problematic feedwaters.

BSC 8809 is a neutral product and is formulated to be used on both thin-film composite and cellulose-acetate membranes.

BSC 8809 is NSF registered under Standard 60 for use as a reverse osmosis scale inhibitor in potable water applications up to a maximum use rate of 25 ppm.

Methods of application

BSC 8809 should be injected into the feedwater line of the reverse osmosis unit just before the cartridge filter. BSC 8809 should be added at the rate of 5–25 ppm of product as delivered. However, the product is a water-soluble liquid that can be diluted to a convenient strength for smaller applications.

Packaging and handling

BSC 8809 is a water-soluble liquid available in drums, intermediate bulk containers, and in bulk. Keep container closed when not in use. Stock should be rotated on a first-in, first-out basis to minimize storage time.

Refer to the Material Safety Data Sheet for suitable materials of construction for handling and storing this product.

Improper handling of this product can result in injury. Observe all precautions shown on the Product Label and in the Material Safety Data Sheet.

Typical product characteristics

Density at 25°C (77°F)	1.17 g/cm ³
Weight per US gallon	9.7 lb
pH	7.0
pH (100 ppm in water)	7.3

Seller warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions. Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE**. No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty. The exclusive remedy against seller shall be a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

E806W (07/11)

Buckman in Argentina, Australia, Belgium, Brazil, Canada, Chile, China, India, Japan, Korea, Mexico, Singapore, South Africa, and USA
Global Headquarters at 1256 N. McLean Blvd., Memphis, TN 38108, USA Phone (901) 278-0330 / Fax (901) 278-5343 or call 1 800 BUCKMAN in the USA

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BUCKMAN LABORATORIES, INC.

Material Safety Data Sheet

Buckman

BSC 8809

Revision date: 10/14/2010

Buckman Laboratories, Inc.
1256 North McLean Boulevard
Memphis, TN 38108
Phone 1-800-282-5626

24 Hour Emergency Phone

(901) 767-2722

SECTION 1

OSHA HAZARD CLASSIFICATIONS

Irritating to eyes and skin.

SECTION 2

HAZARDOUS COMPONENTS

Chemical Name

CAS Number

% by Weight

TLV

While some substances are claimed as trade secret in accordance with the provision of OSHA 29 CFR 1910.1200(i), all known hazards are clearly communicated within this document.

SECTION 3

FIRST AID INFORMATION

Eye Exposure: Flush immediately with copious amounts of tap water or normal saline (minimum of 15 minutes). Take exposed individual to a health care professional, preferably an ophthalmologist, for further evaluation.

Skin Exposure: Wash exposed area with plenty of water. Repeat washing. Remove contaminated clothing and wash thoroughly before reuse. If irritation persists consult a health care professional.

Inhalation: If exposure by inhalation is suspected, immediately move exposed individual to fresh air. If individual experiences nausea, headache, dizziness, has difficulty in breathing or is cyanotic, seek a health care professional immediately.

Ingestion: DO NOT INDUCE VOMITING. Rinse with copious amounts of water or milk, first. Irrigate the esophagus and dilute stomach contents by slowly giving one (1) to two (2) glasses of water or milk. Avoid giving alcohol or alcohol related products. In cases where the individual is semi-comatose, comatose or convulsing, DO NOT GIVE FLUIDS BY MOUTH. In case of intentional ingestion of the product seek medical assistance immediately; take individual to nearest medical facility.

SECTION 4

PRIMARY ROUTES OF EXPOSURE

1. Effects from Acute Exposure:

Eye Exposure: Hazardous in case of eye contact (irritant).

Skin Exposure: Hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering.

Inhalation: May be harmful if inhaled. Do not breathe spray mists of the product. Effects will depend upon solution strength and length of time of exposure.

Ingestion: Ingestion is not expected to be a primary route of exposure.

2. Effects from Chronic Exposure:

The effects from chronic exposure to this product have not been fully evaluated.

SECTION 5	<i>Toxicological Information</i>
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Acute Effects:

Not tested.

Irritant / Sensitization Effects:

Hazardous in case of eye contact (irritant).

Hazardous in case of skin contact (irritant). Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering.

May be harmful if inhaled. Do not breathe spray mists of the product. Effects will depend upon solution strength and length of time of exposure.

Target Organs Effects:

May cause damage to the following organs: upper respiratory tract, skin, eyes.

Other Health Effects:

None known.

SECTION 6	<i>Environmental Toxicological Information</i>
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LC50 =>100 mg/l 48 hours *Ceriodaphnia dubia*

LC50 = >100 mg/l 96 hours *Fathead minnow*

Note: Although this product has not been tested, the values provided are based on expected toxicity of the individual components within the product.

SECTION 7	<i>Physical and Chemical Properties</i>
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Appearance	Clear to hazy, amber liquid
Odor	Sweet (Slight.)
Density	1.15 to 1.19 g/cm ³ (25°C / 77°F)
Flash Point	Closed cup: 100°C (212°F). (Expected.)
Melting/Freezing Point	0°C (32°F)
Boiling Point	>100°C (212°F)
Solubility	Soluble in cold water. Soluble in hot water.
pH (Neat)	7 to 8.5 [Basic.]
pH (100 ppm in water)	Not available.
Vapor Pressure.....	Not available.
o/w Partition Coefficient	Not available.
Oxidizing/Reducing Properties .	Not available.
Viscosity	Not available.
Additional pH Information	Not available.

NOTE: The physical data presented above are typical values and should not be construed as specifications.

SECTION 8***Fire and Explosion Information***

Flammable Limits Not available.

Extinguishing Media Water fog, carbon dioxide, foam, dry chemical.

Special Firefighting Procedures Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

SECTION 9***Reactivity Information***

Stability Stable under normal conditions of use and storage.

Incompatibility Strong acids, strong bases, strong oxidizers, and reducing agents.

Hazardous Decomposition Products Oxides of carbon, acrylic monomers.

SECTION 10***Handling Precautions***

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations below established levels or to control vapor and/or mist level. When established limits are exceeded or misting may occur in the work area, a NIOSH/MSHA approved respirator may be required. Use a respirator approved for the material and level of exposure. A comprehensive respiratory protection program is needed when respirators must be used. Use chemical resistant gloves, indirect ventilation goggles, body-protective clothing, and chemical resistant safety shoes. Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of this product.

The handling precautions for this product are based on the characteristics of the neat product unless otherwise specified.

NSF Certification: This product is listed by NSF International to NSF/ANSI Standard 60 as a reverse osmosis antiscalant in potable water systems to a maximum use rate of 25 mg/l.

SECTION 11***Satisfactory Materials of Construction***

304 Stainless steel

316 Stainless steel

Polyethylene - crosslink

Polyethylene - high density

Polyethylene - low density

Polypropylene

PVC - flexible

PVC - rigid

EPDM rubber

Rehau Tubing

Neoprene

Buna-N rubber

Silicone rubber

Viton

Butyl rubber

ABS (Plastic)

6/6 Nylon

Teflon

Morton test liner (108 T 44LV)

Tygon F-4040
Tygon tubing R3603
Polyisoprene Rubber
Polyurethane Tubing
Pharmed Tubing
FRP
Norprene
Dow Sillastic Tube

NOTE: With respect to all other materials not listed above, user should be aware that use of such materials with this product may be hazardous and result in damages to such materials and other property and personal injuries. No data concerning such materials not listed above should be implied by the user.

SECTION 12***Spill, Leak, and Disposal Procedures*****SPILL AND LEAK RESPONSE GUIDELINES:**

Important: Before responding to a spill or leak of this product, review each section of this MSDS. Follow the recommendations given in the Handling Precautions sections. Check the Fire and Explosion Data section to determine if the use of non-sparking tools is merited. Insure that spilled or leaked product does not come into contact with materials listed as incompatible. If irritating fumes are present, consider evacuation of enclosed areas.

Emergency Response Assistance: Emergency technical assistance is available at any time from Buckman Laboratories, Inc., by calling (901) 767-2722.

Initially minimize area affected by the spill or leak. Block any potential routes to water systems (e.g., sewers, streams, lakes, etc.). Based on the product's toxicological and chemical properties, and on the size and location of the spill or leak, assess the impact on contaminated environments (e.g. water systems, ground, air equipment, etc.). There are no methods available to completely eliminate any toxicity this product may have on aquatic environments. Minimize adverse effects on these environments. Buckman Laboratories, Inc. can be contacted for technical assistance. Determine if federal, state, and/or local release notification is required (see Regulatory Classifications section of this MSDS). Recover as much of the pure product as possible into appropriate containers. Later, determine if this recovered product can be used for its intended purpose. Address clean-up of contaminated environments. Spill or leak residuals may have to be collected and disposed of. Clay, soil, or commercially available absorbents may be used to recover any material that can not readily be recovered as pure product. Flushing residual material to an industrial sewer, if present at the site of a spill or leak incident, may be acceptable if authorized approval is obtained. If product and/or spill/leak residuals are flushed to an industrial sewer, insure that they do not come into contact with incompatible materials. Contact the person(s) responsible for the operation of your facility's industrial sewer system prior to intentionally flushing or pumping spills or leaks of this product to the industrial sewer.

DISPOSAL GUIDELINES

Note: Follow federal, state, and local regulations governing the disposal of waste materials.

Neat Product: Contact your Buckman representative or Buckman Laboratories, Inc., at (901) 278-0330.

Contaminated Materials: Determine if waste containing this product can be handled by available industrial effluent system or other on-site waste management unit. If off-site management is required, contact a company experienced in industrial waste management. This product is not specifically listed in 40 CFR 261 as a Resource Conservation and Recovery Act (RCRA) hazardous waste. However, spill or leak residuals may meet the criteria of a characteristic hazardous waste under this Act. Check the characteristics of the material to be disposed of and/or the physical and reactivity data given in this MSDS for the neat product.

Container Disposal: Empty containers, as defined by appropriate sections of the RCRA, are not RCRA hazardous wastes. However, insure proper management of any residuals remaining in container.

SECTION 13***Transportation and Shipping Information******DOT Shipping Information:*****Not Regulated.*****IMO/IMDG Shipping Information:*****Not Regulated.*****IATA Shipping Information:*****Not Regulated.**

Unless otherwise stated, the shipping information provided above applies only to non-bulk containers of this product. Proper shipping name and general shipping information may vary depending on packaging and mode of shipment. All products shipped from Buckman locations have been properly packaged and labeled according to appropriate hazardous materials shipping regulations. If any alteration of packaging, product, or mode of transportation is further intended, different shipping information, including but not limited to proper shipping name, RQ designation, and labeling may apply. For further information pertaining to the shipping requirements for this product, contact Buckman's Transportation Department or DOT Coordinator.

SECTION 14***Regulatory Information***

The following Regulations are known to apply to the use and disposal of this product. Additional Federal, State and Local regulations may also be applicable.

SARA (Superfund Amendments and Reauthorization Act)*SARA 302 Extremely Hazardous Substances List ...***No components of this product are listed.***SARA 312 Hazard Category ...***Immediate (Acute) Health Hazard***SARA 313 Toxic Chemicals List ...***No components of this product are present above the *de minimus* levels.****CERCLA (Comprehensive Environmental Response, Compensation and Liability Act)****No components of this product are present above the *de minimus* levels.****RCRA (Resource Conservation and Recovery Act) Listed Hazardous Waste****No components of this product are listed.****CWA (Clean Water Act) Listed Substances****No components of this product are listed.****FDA (Food and Drug Administration)**

This product is allowed under the following FDA (21 CFR) sections :173.310 (Limitation: Not to exceed 6.5 ppm in boiler feed water.) 173.45 & 173.73 (sugar mill applications) 176.170 & 176.180.

Bundesinstitut für Risikobewertung (BfR) (The Federal Institute for Risk Assessment)**XXXVI****National Sanitation Foundation (NSF)**

This product is listed by the NSF under NSF/ANSI Standard 60 for use in potable water applications with the following maximum allowable use rates : 25 mg/L

TSCA (Toxic Substances Control Act) Applicability**All components are listed on the TSCA Inventory.****FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act)****This product is not a registered pesticide.****HMIS/NPCA Rating ... Health **1** Flammability **0** Reactivity **0****

NFPA Ratings Health **1** Flammability **0** Reactivity **0**

State Regulations

Various State Right To Know Acts ...

Non-proprietary hazardous chemicals are listed in Section 2 of this MSDS. Should you require further information on specific proprietary or inert ingredients please contact Buckman Laboratories' Regulatory Affairs Department.

The information on this Material Safety Data Sheet reflects the latest information and data that we have on hazards, properties, and handling of this product under the recommended conditions of use. Any use of this product or method of application which is not described in the Data Sheet is the responsibility of the user. This Material Data Safety Sheet was prepared to comply with the OSHA Hazard Communication regulations. While some components are claimed Trade Secret under OSHA Hazard Communication regulations, all known OSHA hazards associated with the Trade Secret component(s), if contained in this product, are fully disclosed.

Buckman Laboratories, Inc. warrants that this product conforms to its chemical description and is reasonably fit for the purpose referred to in the directions for use when used in accordance with the directions under normal conditions. Buyer assumes the risk of any use contrary to such directions.

Seller makes no other warranty or representation of any kind, express or implied, concerning the product, including **NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS OF THE GOODS FOR ANY OTHER PARTICULAR PURPOSE**. No such warranties shall be implied by law and no agent of seller is authorized to alter this warranty in any way except in writing with a specific reference to this warranty.

The exclusive remedy against seller shall be in a claim for damages not to exceed the purchase price of the product, without regard to whether such a claim is based upon breach of warranty or tort.

Any controversy or claim arising out of or relating to this contract, or breach thereof, shall be settle by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgement upon the rendered by the Arbitrator(s) may be entered in any court having jurisdiction thereof.

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	METHOD FOR STIMULATING OR REMEDIATING BY USE OF A CHELATING AGENT			
First Named Inventor/Applicant Name:	Bryce Conway			
Filer:	Michael Hoyt Smith/Janella Rose			
Attorney Docket Number:	331299.01663			
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:				

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

Electronic Acknowledgement Receipt

EFS ID:	18755432
Application Number:	61979210
International Application Number:	
Confirmation Number:	4503
Title of Invention:	METHOD FOR STIMULATING OR REMEDIATING BY USE OF 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:	331299.01663
Receipt Date:	14-APR-2014
Filing Date:	
Time Stamp:	15:43:03
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$ 130
RAM confirmation Number	2182
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 1.17 (Patent application and reexamination processing fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges) **PHARAOH, EX. 1007**

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Provisional Cover Sheet (SB16)	990343-01663_sb16_PRV_Transmittal.pdf	109500 40fc29a6f89a47937de2a2a8d827f3a040f94e0a	no	2
Warnings: This is not a USPTO supplied Provisional Cover Sheet SB16 form.					
Information:					
2		990343-01663_PRV_Application.pdf	8890234 0b0d5e645db8e658152c2123a9dd82a5eb42f7c	yes	21
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	6	
	Claims		7	7	
	Appendix to the Specification		8	21	
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	29801 426643883f2ee62080fe4352b5ec05285aafb714	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			9029535		
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