Green Ultimate Recovery LLC
A New Approach to Well and Field Production Optimization

John Pantano
Bonnie Milne-Andrews
Increased Oil and Gas Recovery
Lower Water Handling Costs
Longer Field and Well Life

Cost
$1-10 Incremental per BOE
An Inconvenient Truth.....

- Too much water is produced at the surface leaving large volumes of hydrocarbons behind and less pressure in reservoir.

- Water production operations are costly and cut into oilfield profit.

- Green Ultimate Recovery stands as the team who will work to reverse that historic inconvenient truth.
Green Ultimate Recovery
Increase Recovery & Lower Costs

• Green Ultimate Recovery, LLC holds 2 patents for unique combinations of low-cost chemical reagents, carrier fluids and a delivery process to boost production in aging assets and increase EUR in tight oil assets.
• Reservoir-specific carrier fluids and reagent combos are injected into the well and interact with the surrounding reservoir out 100 to 1000 feet.
• The chemical reagents and carrier fluids free oil by reacting with formation water pressure.
• The chemical reactions with the connate water redirect the energy of the water to mobilize evasive oil from the reservoir into the production stream.
Green Ultimate Recovery, LLC

Who are We?

• John Pantano, PhD. is industry acclaimed Petroleum Specialist and expert in Organic and Inorganic chemistry of porous media and fluid. Innovated, built and optimized subsurface and surface operations of large scale fluid systems.
• Bonnie Milne-Andrews, MSc Geology serves as Technical and Business Development Liaison.
• Strategic partners in Engineering, Chemical Formulation and Geosciences
• Won Award for Most Promising Company at the 2015 OTC-sponsored Rice Alliance Startup Roundup.

https://www.linkedin.com/pulse/green-ultimate-recovery-most-promising-company-rice-otc-john-pantano
Industry and Academic Strategic Relationships

Petroleum Engineering
- AT&T
- CHEMICAL TRACERS, INC.
- SHALE TEC
- GREEN Ultimate Recovery

Chemicals
- Surtex, Inc.
- Creative Engineers, Inc.
- UNIVERSITY of WYOMING
- AT&T TEXAS A&M CLEAN ENERGY INCUBATOR
- GREEN Ultimate Recovery

Geosciences
- ROCKFLUID SYSTEMS, Inc.
- ZetaWare, Inc.
- PITCHAPALOOZA
What Do We Do?

• Our approach is unique in that it also stimulates natural gas production associated with irreducible oil saturation.

• This produced gas essentially stands as a “free” by-product of the treatments and can be used for additional oil recovery enhancements.

• Green Ultimate Recovery LLC has also developed a patented chemical delivery system to stimulate unconventional resources at remote locations in a safe manner.
Our Claim

• Reduce produced water by 50%
• Harvest residual oil & gas
• Increase recovery from 35-60% to 50-80% in conventional reservoirs
• Increase primary recovery in horizontal wells by applying technique at start of well stimulation; push tight oil systems to 20% to 40% recovery
IP and Freedom to Operate—
2 Patents and 1 Patent Application

United States Patent
Pantano

(54) INCREASED RESOURCE RECOVERY BY INORGANIC AND ORGANIC REACTIONS AND SUBSEQUENT PHYSICAL ACTIONS THAT MODIFY PROPERTIES OF THE SUBTERRANEAN FORMATION WHICH REDUCES PRODUCED WATER WASTE AND INCREASES RESOURCE UTILIZATION VIA STIMULATION OF BIOGENIC METHANE GENERATION

(76) Inventor: John Pantano, Butte, MT (US)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 878 days.

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(58) Field of Classification Search
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USPC 166/305

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(45) Date of Patent: Jun. 28, 2016

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(74) Attorney, Agent, or Firm — Douglas Baldwin

(57) ABSTRACT
Methods of resource recovery include reagents placed in a subterranean formation. The reagents generate heat, hydrogen gas and alkalinity which changes fluid flow characteristics. The forces of the reactions create fractures and cracks far from the wellbore. These cracks and fractures are sealed if water is being transmitted through or near the reactions. As a result, the targeted fluids more efficiently flow to the well, along with decreased amounts of water waste, while stimulating generation of biogenic gases in the subterranean formations.

33 Claims, 6 Drawing Sheets

United States Patent
Pantano

(54) METHODS AND SYSTEMS OF DOWN-HOLE REAGENT PROCESSING AND DEPLOYMENT

(71) Applicant: John Pantano, Butte, MT (US)
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(73) Assignee: John Pantano, Bryan, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 501 days.

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(58) Field of Classification Search
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(57) ABSTRACT
The invention is a processing vessel having an outer container enclosing a reaction/mixing/delivery chamber with a mixing motor and a delivery pump for delivering a chemical formulation produced in the reaction/mixing/delivery chamber to a subterranean location.

19 Claims, 10 Drawing Sheets

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Seeking

Equity Partnership(s)

• Investors as strategic partners to fund field trials and small company expenses
• Percentage of investment is negotiable
• GUR Team has invested estimated $250K to date in expenses, equipment and time

Operator Partners

• Cost-sharing of Green Ultimate applications through profit sharing of incremental production
• Direct Fee for application of Green Ultimate technology in operator assets

Field Trial Candidates

• Fields requiring HC recovery improvements and mitigation of water issues; Shallower and thinner reservoirs allow lower cost tests. API gravity 25-55 in either clastic or carbonate ideal case
Methodology

- Chemical treatment consumes water and produce heat and hydroxides.
- The chemicals are mixed with a carrier fluid and injected into formation. The well is then operated to recover formation fluids. As formation fluids displace carrier fluids solid chemicals react to block water and facilitates the movement of oil and gas. The reagent don’t react with petroleum and wait to cut off water.
- **How are the chemicals deployed into the reservoir/well?**
  - 1) During a fracking operation,
  - 2) Step of an acidizing job,
  - 3) Bullhead treatment like huff and puff,
  - 4) Part of flood operation.
Methodology

• **What kind of equipment is needed?**
  – A mixing tank is required to get the right concentrations of chemicals into the carrier fluid.
  – The chemicals are micron to nanometer in size and therefore highly reactive and also easily suspended in carrier fluid.

• **How much time does it take to deploy the technology on a single well?**
  – The time is similar to the other traditional techniques of fracturing, acidizing, huff and puff or water flood.
Safe Delivery of Reactive Reagents
Placement and Reactions
Cost

• **How much does a well treatment cost?**
  – 20-200% more than an acidizing job or huff and puff.

• **When?**
  – Evaluations can start immediately and little additional information needed. History of remedial or stimulation activities successes and hurdles are used to select chemical and carrier fluid along with volumes and injection rates.

• **Any limitations?**
  – No IP issues
  – The delivery of the chemical could take weeks to month depending on availability for delivery and also mixing equipment. Standard work over rigs and pumps are available from service companies.
Estimated Well and Field Cost

- **Remediate Old Wells**: $1K – 50K/ Treatment
- **New Well Stimulation**: $10K – 1M/Well
- **Chemical Reactive Fracturing**: $100K – 4M/Well
Status of Business Plan

- The Technologies
- The IP
- Scientific Expertise
- Technical Support
- Market Analysis
- Field Trials
Next Steps- Field Trials

• Seeking Smart Partners or Team members that can help deploy Green Ultimate Recovery technologies.
• Money to do the above
• No limitations in terms of IP Existing patents and applications provide freedom to test and operate.
• The secret to success will be advanced by field trials
Green Ultimate Recovery, LLC

Business Plan

Short term

- Raise resources and field partners to test and refine chemical and carrier fluid injection on marginal wells
- Establish metrics to gain additional funding

Long term

- Commercialize a Marginal Wells Service
- Identify, acquire and optimize historic undervalued producing properties.
- Test and refine method for tight oil reservoirs
- Commercialize tight oil reservoir treatment method
High volumes stranded oil
Significant water volume interfering with production
High numbers of stripper wells and fields as technology target
Low Recoveries in Unconventional Reservoirs

Current Economic Climate
Industries Conservative Slant
Only antidotal field trial

Proven Innovator, Solid Science, Patents in Place
Ability to integrate and interpret data to optimize process

New technology, Small team,
Competition for investors focused on new technologies

SWOT

STRENGTHS

WEAKNESSES

OPPORTUNITIES

THREATS
Project Return On Investment

• High risk-high reward
• Difficult to quantify
• Philosophy of team and investment/partnering strategy is elevate Green Ultimate Recovery to industry standard practice within the decade.
• If not... fail early, identify fatal flaws and pivot quickly
Risk Management Strategy

• Learn through initial test projects and build from lessons learned
• Establish relationships with early adopters for entry into larger unconventional oil projects (ongoing).
• Continue to add experienced and successful team members and strategic partners.
First 30 Years

Red = Gas
Oil = Black
Water = Blue

Reaction = Green

> 30 Years

Red = Gas
Oil = Black
Water = Blue
Seeking Equity Partnership(s)

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Green Ultimate Patented Recovery’s Method

• More Oil -- Less Water
  – Increase Drainage Volume
  – Blocks Water
    • Optimizes Water Power
  – Creates Micro Fracture
    • Release Oil From Pores
  – Oil Slicker – Easier Flow
  – Enhanced Well and Field profitability
Staged Technology Deployment

Remediate Old Wells

Demonstrate Effectiveness

High Demand

New Well Stimulation

Early Adopters

Tune Field & Life Of Well

Fracking 2.0

Higher Rewards

New Frontiers
3rd Generation Unconventional

Unlocking the Untapped Source Rocks of Remote Giant Fields
Life of Field

- Stimulation
- Enhanced Recovery
- Residual to Gas

Technologies Applications

- Size of circle indicates amount of effort

Technical Difficulty

- Hard
- Easy

Profits

- Small
- Big
- Huge
- Obscene
- Insane

Well

Field