BDL Environmental Technologies, L. L. C.

'The' Solution for the Treatment of O&G Production Well Water

Preface: BDL's Technologies

- BDL is a repository of paradigm shift technologies for water/wastewater treatment.
- BDL technologies are backed by superior science & BDL's >$600K Diagnostic Laboratory.
- The BDL Diagnostic Laboratory allows us to do the following:
  - Scientifically and accurately determine ALL the constituents in any given water or wastewater
  - Accurately determine the technology components needed to treat the water to potable standards
  - Accurately determine all design & engineering elements to scale any size water treatment depot
  - Accurately determine both CAPEX and OPEX for any size depot before construction or deployment
- BDL's water treatment technologies are applicable to a wide scope of applications, but the following presentation demonstrates/validates our technologies efficacy on the successful treatment of the entirety of wastewater generated in the production of O&G by FSC's and ENC's:
  - Make-up water
  - Frac flowback water (including removal of Frac Gels, including Guar Gum)
  - Coil water
  - On-going production well water
  - Flood water
- Deployment of BDL Depot effectively eliminates the need for SWD's and seismic activity.

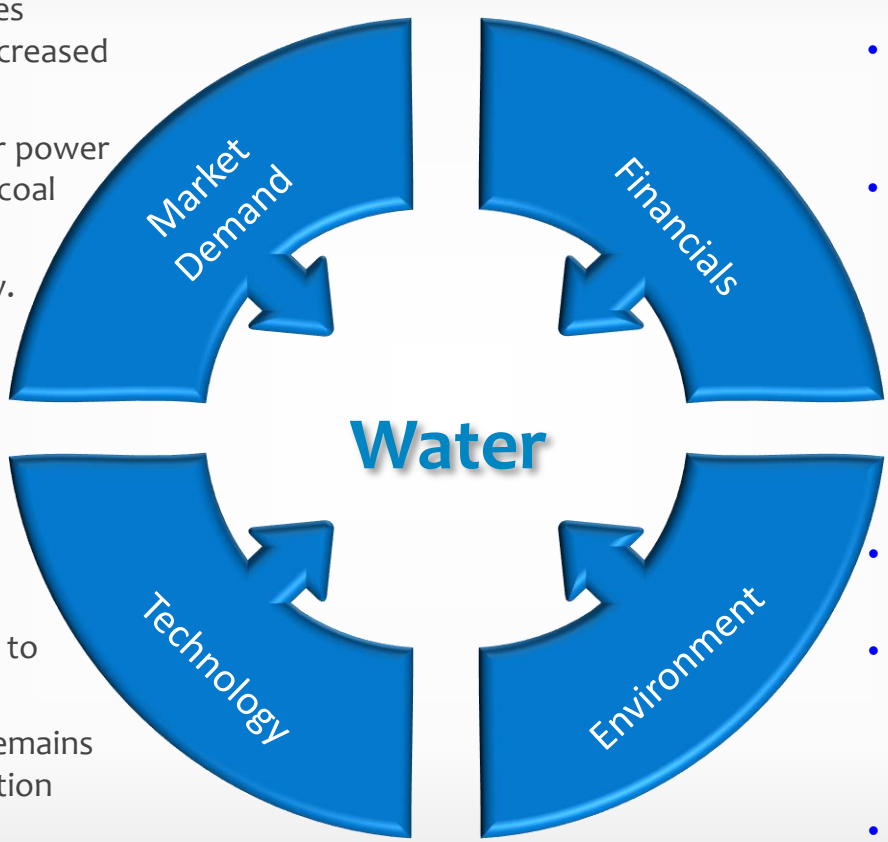
Setting A New Standard

Our mission is to '*redefine*' total compliant wastewater management.
Our initial focus is the treatment of the >31 Billion barrels of production well water generated annually in the United State by the O&G industry. We know we can achieve our goal.
We have already effectively treated O&G wastewater and remove >99.0% of all Total Dissolved Solids (TDS) from 3,000 - 350,000+ p.p.m., and have done so with ZERO reject water.
Essentially we can eliminate any need for SWD's.
We can recycle 100% of this water and save millions of dollars in the process.

Stuart E. Forrest
President & CEO
BDL Environmental Technologies, L. L. C.

Water: The Core of Mounting Pressure on O&G Production

- Domestic O&G production is down, but water volumes continue to flow and increased >6.0% in 2015.
- Industrial and Consumer power demand alternatives to coal have driven growth.
- Push for export capacity.



- Shortages increase fresh water sourcing costs.
- Disposal expenses soar as production water volumes and transport costs increase.
- Liability for spills, contamination and seismic activity expanding.

- Horizontal drilling (shale plays), will remain the technology in the future to release trapped O&G.
- Treatment technology remains seriously behind production advancements.
- Water reuse, recycling or repurposing is in its infancy, but critical to future growth.

- >31 Billion barrels of produced water generated in 2015.
- Increasing governmental & public pressure to eliminate or further regulate disposal and storage options.
- Dramatic increases in seismic activity attributed directly to increases in the number and water volume of SWD's.

Current Industry Practices

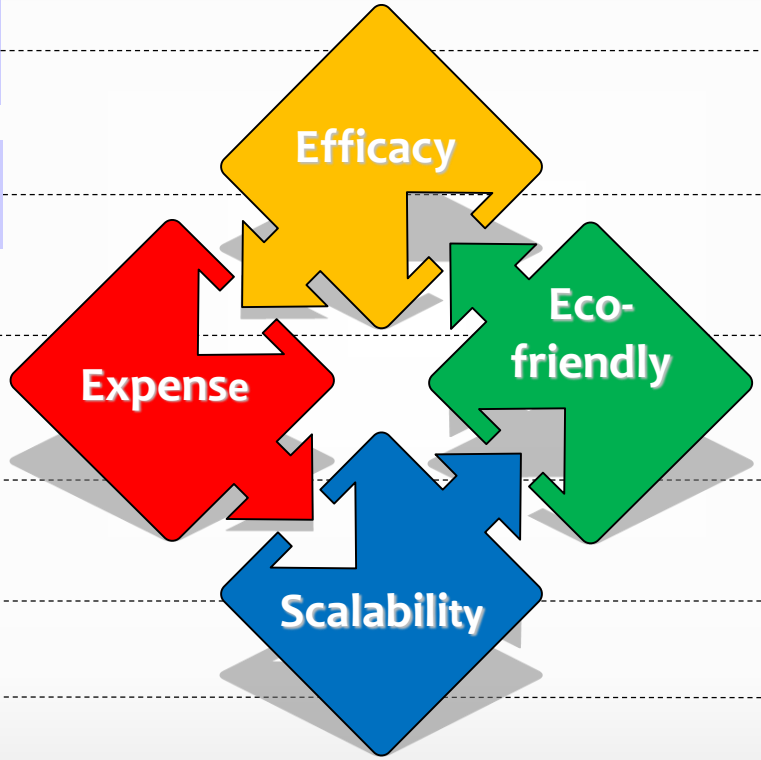
- **Choose It**
  - Oil and Gas Industry very often consumes water needed by municipalities, ranchers, agriculture and leisure
- **Use It**
  - Vast amounts for drilling and fracing (Billions of Barrels Annually)
  - Lesser amounts for well completion and other activities
  - Add chemicals and sand for fracing
- **Abuse It**
  - Recovered water contains sludge, chemicals, H_2S, hydrocarbons, metals, salts and other toxic constituents
- **Lose It**
  - Disposal of produced water (heavy brine) in reinjection wells (SWD's) renders it totally inaccessible or reusable for O&G production purposes

Overall BDL Strategy – "Upcycle"

- Recycle
  - NO Produced Water is disposed of by reinjection (SWD's) back into the earth with no 'accountability'
  - NO secondary disposal by service companies after inadequate treatment options into rivers, streams, or oceans creating environmental disasters and expenses
- Reuse
  - Dirty water can be successfully treated for reuse within the O&G industry greatly reducing the demand for fresh water from already stressed water sources
  - Other amounts can be made available for agricultural and irrigation applications
- Repurpose
  - Generate other useful products, proximal and immediately available, to a variety of industries
  - Eliminate all secondary waste stream issues

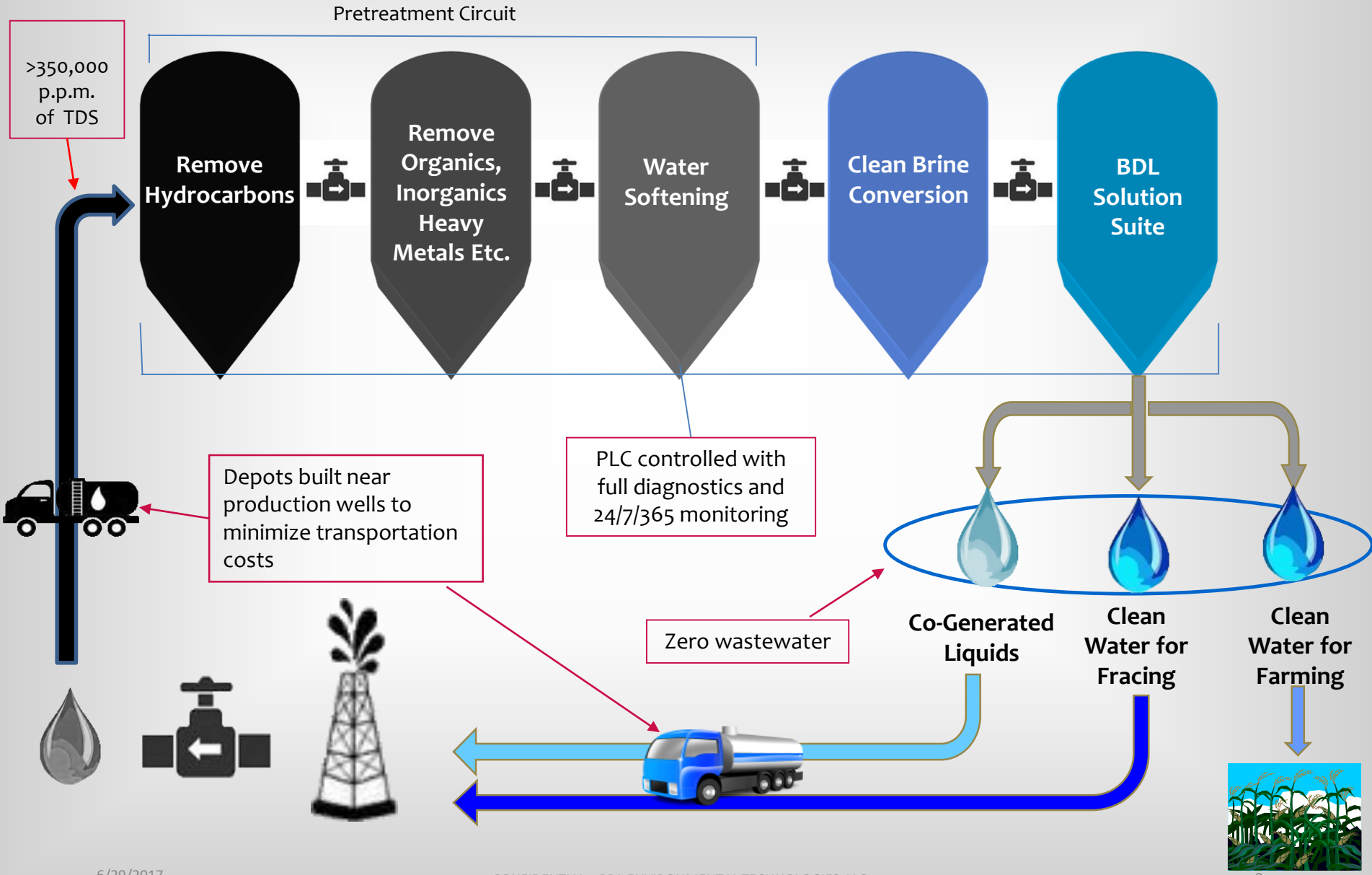
BDL Solves The Production Water Puzzle

Current Best of Breed	The BDL Standard
Only treats TDS <50,000 mg/L	Treats TDS to >350,000 mg/L
Generates secondary waste stream or 'reject' brine water	Zero untreated water: no brine or solid waste disposal
Toxic chemicals required for the treatment process	Environmentally friendly – uses NO toxic chemicals
Treatment sites not easily moved or scaled	Both capacity & site locations expandable to meet growth
Treatment/disposal/transport costs $3.00 - $14.00 per barrel	Fixed cost per daily volume 'caps' disposal costs for years
High energy consumption	Low energy demands
Liability for spills & disposal	Eliminates liability for water treatment and disposal
Heavy reliance on re-injection wells & high transport cost	No re-injection wells needed transportation reduced < 6-miles



How It Works

BDL dramatically improved two battle-tested water treatment technologies along with its own innovations to define a new standard for production well water treatment.



Water Characterization

Wells Ranch Provided Water Characterization Report

10/7/13

Parameter (mg/L)	**Ecomode**	**Flowback**	**Coil-20**	**Coil-15**
pH	6.6	8.8	7.7	7.5
Conductivity (mmhos/cm)	67.8	1.89	12.3	8.97
TDS	**33,915**	**930**	**6,315**	**4,686**
Total Hardness	**1,215**	**406**	**510**	**473**
Aluminum	1.58	0.624	5.36	4.89
Calcium	336	87.6	133	116
Iron	78.6	17.7	43.4	80.6
Magnesium	51.3	29.2	20.1	22.1
Boron	16.7	1.14	5.96	3.70
Barium	18.2	0.227	4.49	4.14
Manganese	1.03	0.259	0.621	0.885
Strontium	50.2	1.45	9.8	6.87
Sulfate	4.1	103	698	515
Silicon	38.3	3.76	31.0	21.0
Silica	81.0	8.08	65.5	44.6
TSS	165	59	1,116	1,139
TOC	**912**	**268**	**2,637**	**2,469**
Gelling agent (Polysaccharides)	**749**	**67.2**	**2,006**	**966**
Oil & Grease	<5.0	<5.0	232	94.6

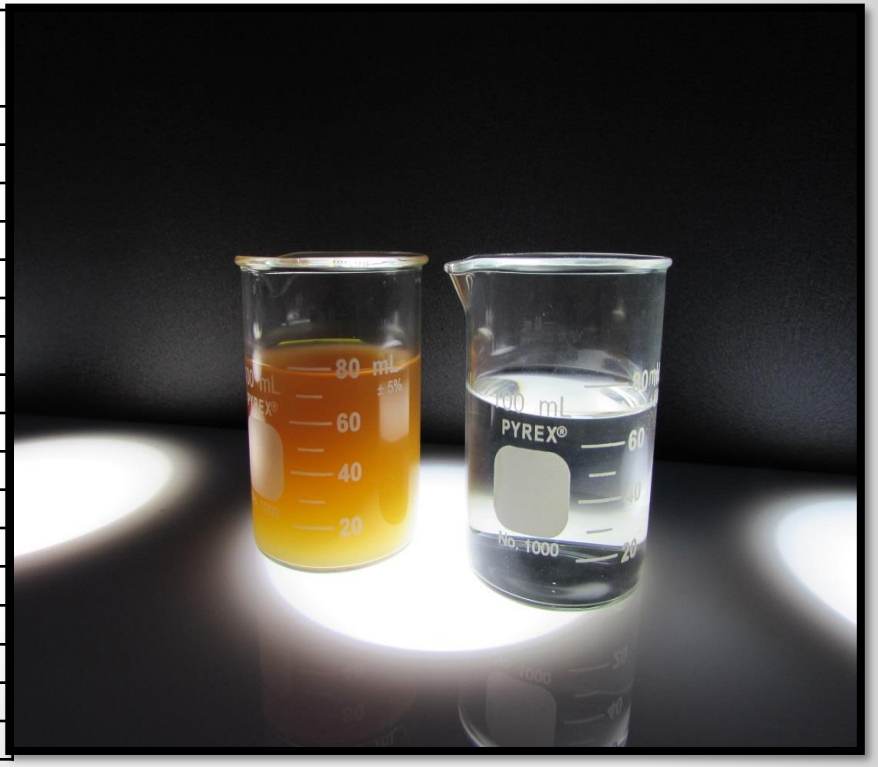
The Results

Wells Ranch Produced Water Test Result Summary

3/26/14

Parameter (mg/L)	**As Received**	**Pretreated**	**Final**	**% Removed**
pH	6.095	7.55	6.67	------
Conductivity (µS/cm)	35,500	28,250	306	99.14
TDS	**23,900**	16,700	200	99.16
Total Hardness (as $CaCO_3$)	**1,010**	<1	ND	100
Aluminum	0.0596	ND	ND	100
Calcium	316	1.12	ND	100
Iron	203	ND	ND	100
Magnesium	45.7	0.491	NA	98.92
Boron	21.1	NA	1.53	92.75
Barium	16.3	0.0717	NA	99.56
Manganese	2.16	ND	ND	100
Strontium	51.7	0.375	NA	99.27
Silicon	41.9	NA	0.0289	99.93
Silica (SiO_2)	89.6	NA	0.0618	99.93
TSS	540	ND	ND	100
TOC	**1,130***	7.91	2.43	99.78
Sulfate	ND	ND	NA	-----

BEFORE & AFTER TREATMENT PHOTOS



ND – Not Detected at or above the reporting limit
NA – Not Analyzed
mg/L = p.p.m.
*TOC contained heavy concentrations of Guar

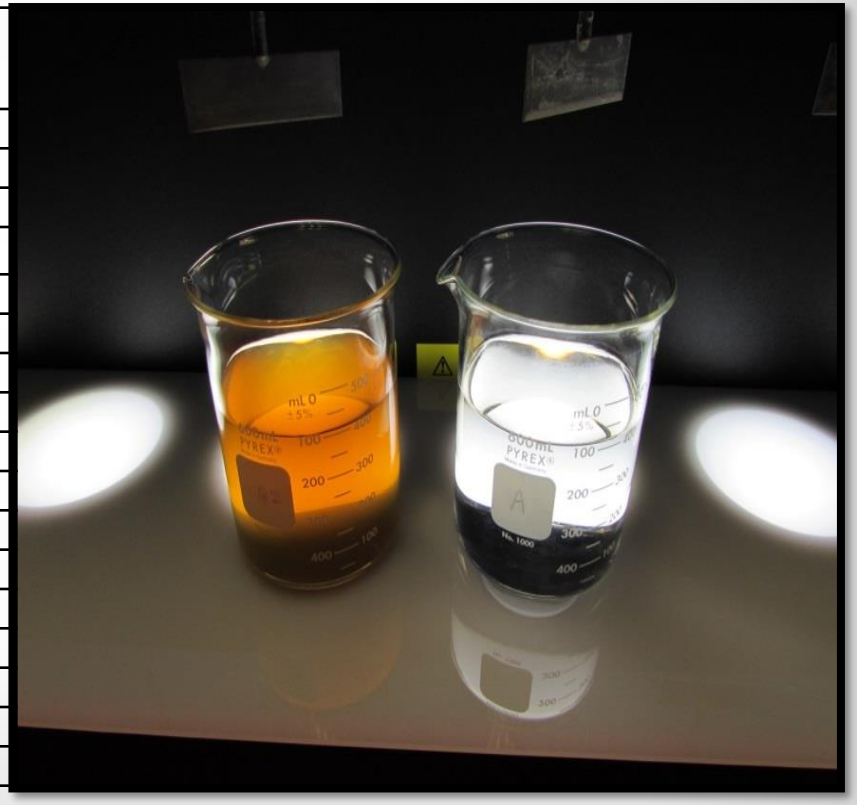
The Results

Wells Ranch Flowback Water Test Result Summary

3/31/14

Parameter (mg/L)	**As Received**	**Pretreated**	**Final**	**% Removed**
pH	6.97	8.56	9.98	-----
Conductivity (µS/cm)	22,800	18130	223	99.02
TDS	**17,300**	10200	52	99.69
Total Hardness (as $CaCO_3$)	**600**	25	ND	>99.99
Aluminum	11.6	ND	NA	>99.99
Calcium	205	7.22	NA	96.47
Iron	34.1	ND	NA	>99.99
Magnesium	2620	1.44	NA	99.94
Boron	17.6	NA	1.44	91.81
Barium	4.56	0.0688	NA	98.49
Manganese	ND	ND	NA	-----
Strontium	19.9	1.23	NA	93.81
Sulfate	243	ND	NA	>99.99
Silicon	48.5	NA	0.0439	99.90
Silica (SiO_2)	104	NA	0.0939	99.90
TSS	ND	ND	NA	-----
TOC	**4,440***	NA	159	96.41

BEFORE & AFTER TREATMENT PHOTOS



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mg/L = p.p.m.
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The Results

Woodford Shale Produced Water Test Result Summary

3/11/14

Parameter (mg/L)	**Influent**	**Pretreated**	**Final**	**% Removed**
pH	6.2	11.5	7.22	-----
Conductivity (µS/cm)	121,000	100,000	<1	100
TDS,	**89,000**	73,200	ND	100
Total Hardness, mg/L ($CaCO_3$)	**19,223**	ND	NA	100
Aluminum	10.5	ND	NA	100
Calcium	5230	3.01	NA	99.94
Iron	5.81	ND	NA	100
Magnesium	1,560	0.776	NA	99.95
Barium	120	0.09	NA	99.92
Manganese	1.28	ND	NA	100
Strontium	285	0.281	NA	99.90

BEFORE & AFTER TREATMENT PHOTOS

ND – Not Detected at or above the reporting limit
NA – Not Analyzed
mg/L = p.p.m.

The Results

Bakken Produced Water Test Result Summary – Phase 1

5/15/14

Parameter (mg/L)	**Influent**	**Pretreated**	**Final**	**(%) Removed**
pH	5.98	6.96	7.10	-----
Conductivity (µS/cm)	240,000	200,000	<1	>99.99
TDS	**331,000**	176,000	ND	>99.99
TSS	954	ND		>99.99
Total Hardness ($CaCO_3$)	**44,000**	<5		>99.98
Aluminum	1.57	ND		>99.99
Ammonia (as N)	980	1.51		>99.84
Calcium	16,200	6.14		>99.96
Iron	39.0	ND	NA	>99.99
Magnesium	447	0.520		>99.98
Barium	6.70	0.128		>98.08
Manganese	6.71	ND		>99.99
Strontium	1,020	0.698		>99.93
Sulfate	884	15.2		>98.28

BEFORE & AFTER TREATMENT PHOTOS

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mg/L = p.p.m.

Business Proposition:

- BDL's **'Offer'**

1. Treatment of 100% of producer's production well water with ZERO secondary disposal issues
2. A guaranteed 'cap' on producer's per barrel water treatment costs for the next 3-15 years
3. >85% reduction in transportation charges
4. Eliminate the need for SWD's
5. Elimination of contingent water liabilities
6. Guaranteed expansion to meet producer's growth requirements, regardless of volume or location at a fixed 'per barrel' rate
7. Ability to handle TDS levels from <1,000 - >350,000 p.p.m & hardness >40,000 p.p.m.
8. 24/7/365 service
9. Save producers hundreds of thousands of dollars per month in current operating costs
10. Requires minimum if any changes in daily operations

- BDL's **'Ask'**

1. Provide us a certified laboratory water characterization analysis of your production well water that will require treatment by our technology
2. We will provide you a quote for the laboratory treatability study of your water
3. Send us 30-gallons of your production well water that represents the water that needs disposal/treatment for testing and analysis in our Tennessee diagnostic laboratory
4. Agree to an initial service contract of 3-5 years … if we do what we say we can with your production well water
5. Deliver the agreed to volume (BPD) of water to our depot when it opens
6. Work with us to fulfill <u>your</u> expansion plans and strategies

Conclusion

BDL tips the scales to a 'new standard' in Production Well Water Treatment that saves producers money, AND, reduces total demand for fresh water.

Thank You For Your Interest In

BDL Environmental Technologies, L.L.C.