KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1294818

Form U3C
June 2015
Form must be Typed
Form must be completed on a per well basis

ANNUAL REPORT OF PRESSURE MONITORING, FLUID INJECTION AND ENHANCED RECOVERY

Complete all blanks - add pages if needed. Copy to be retained for five (5) years after filing date.

OPERATOR: License # 33999
Name: Linn Operating, Inc.
Address 1: 600 TRAVIS STE 5100
Address 2:
City: HOUSTON State: TX Zip: 77002 + 3018
Contact Person: Shawn Hildreth
Phone: (281) 840-4000
Lease Name: OLOMAN SWD
Well Number: 1

API No.: 15-055-21384-00-00
Permit No: D27071.0
Reporting Year: 2015
(January 1 to December 31)

____ - NE - NE - NW Sec. 1 Twp. 26 S. R. 33 ☐ E ☑ W
(Q/Q/Q/Q)
6990 feet from ☐ N / ☑ S Line of Section
2921 feet from ☑ E / ☐ W Line of Section
County: Finney

I. Injection Fluid:

Type *(Pick one)*: ☐ Fresh Water ☑ Treated Brine ☐ Untreated Brine ☐ Water/Brine
Source: ☑ Produced Water ☐ Other *(Attach list)*
Quality: Total Dissolved Solids: 203954 mg/l Specific Gravity: 1.14 Additives: 15% HCL
(Attach water analysis, if available)

II. Well Data:

Maximum Authorized Injection Pressure: 300 psi Injection Zone: LANSING
Maximum Authorized Injection Rate: 5000 barrels per day
Total Number of Enhanced Recovery Injection Wells Covered by this Permit: _____ *(Include TA's)*

III.

Month:	Total Fluid Injected BBL	Maximum Fluid Pressure	Total Gas Injected MCF	Maximum Gas Pressure	# Days of Injection
January	22001	3	0		31
February	25164	3	0		28
March	24448	3	0		31
April	21123	1	0		30
May	22125	1	0		31
June	21290	1	0		30
July	23056	1	0		31
August	20420	1	0		31
September	28831	1	0		30
October	34220	-4	0		31
November	19519	-1	0		30
December	19778	1	0		31
TOTAL	281975		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

LINN OPERATING
MICHAEL BELLOMY
FINNEY KS

OLOMAN SWDW
FLOWLINE

Report Date: 01-22-2016
Sample #: 3076

Sampled: 01-11-2016
at 0000

Sample ID: 117378

CATIONS		ANIONS	
Calcium (as Ca)	11480	Chloride (as Cl)	135800
Magnesium (as Mg)	2952	Sulfate (as SO_4)	925.00
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	231.60	Dissolved CO_2 (as CO_2)	165.00
Sodium (as Na)	60472	Bicarbonate (as HCO_3)	42.70
Potassium (as K)	704.60	Carbonate (as CO_3)	0.00
Lithium (as Li)	10.48	Oxalic acid (as C_2O_4)	0.00
Ammonia (as NH_3)	0.00	Silica (as SiO_2)	0.00
Aluminum (as Al)	0.00	Phosphate(as PO_4)	0.00
Iron (as Fe)	2.68	H_2S (as H_2S)	0.500
Manganese (as Mn)	0.0120	Fluoride (as F)	0.00
Zinc (as Zn)	1.67	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	24.99

PARAMETERS

Calculated T.D.S.	203954
Molar Conductivity	349015
Resistivity	2.87
Sp.Gr.(g/mL)	1.14
Pressure(atm)	1.00
pCO_2(atm)	0.00969
pH_2S(atm)	< 0.001
Temperature (^oF)	53.30
pH	6.21

COMMENTS

FINNEY KS

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

JACAM LABORATORIES

DownHole R_X

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
MICHAEL BELLOMY
FINNEY KS

OLOMAN SWDW
FLOWLINE

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SATURATION LEVEL		MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	0.131	Calcite ($CaCO_3$)	-0.00704
Aragonite ($CaCO_3$)	0.116	Aragonite ($CaCO_3$)	-0.00807
Witherite ($BaCO_3$)	< 0.001	Witherite ($BaCO_3$)	-25.81
Strontianite ($SrCO_3$)	0.00280	Strontianite ($SrCO_3$)	-0.555
Calcium oxalate (CaC_2O_4)	0.00	Calcium oxalate (CaC_2O_4)	-0.00322
Magnesite ($MgCO_3$)	0.0328	Magnesite ($MgCO_3$)	-0.0263
Anhydrite ($CaSO_4$)	0.586	Anhydrite ($CaSO_4$)	-63.60
Gypsum ($CaSO_4*2H_2O$)	0.809	Gypsum ($CaSO_4*2H_2O$)	-24.16
Barite ($BaSO_4$)	0.469	Barite ($BaSO_4$)	-0.136
Celestite ($SrSO_4$)	0.234	Celestite ($SrSO_4$)	-153.05
Fluorite (CaF_2)	0.00	Fluorite (CaF_2)	-1.75
Calcium phosphate	0.00	Calcium phosphate	>-0.001
Hydroxyapatite	0.00	Hydroxyapatite	-239.64
Silica (SiO_2)	0.00	Silica (SiO_2)	-21.26
Brucite ($Mg(OH)_2$)	< 0.001	Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00	Magnesium silicate	-77.68
Iron hydroxide ($Fe(OH)_3$)	< 0.001	Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	0.00	Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	0.0120	Siderite ($FeCO_3$)	-0.0963
Halite (NaCl)	0.184	Halite (NaCl)	-81139
Thenardite ($Na2SO_4$)	< 0.001	Thenardite ($Na2SO_4$)	-87273
Iron sulfide (FeS)	0.00714	Iron sulfide (FeS)	-0.786

SIMPLE INDICES		BOUND IONS	TOTAL	FREE
Langelier	-0.161	Calcium	11480	11291
Ryznar	6.53	Barium	0.204	0.204
Puckorius	6.12	Carbonate	0.282	0.00182
Larson-Skold Index	6410	Phosphate	0.00	0.00
Stiff Davis Index	-0.368	Sulfate	925.00	184.55
Oddo-Tomson	-1.29			

OPERATING CONDITIONS

Temperature (^oF)	53.30
Time(secs)	0.00

JACAM LABORATORIES
205 S. Broadway · P.O. Box 96 · Sterling, KS 67579-0096

DownHole SAT™ Water Analysis Report

JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
OLOMAN SWDW
MICHAEL BELLOMY
FLOWLINE
FINNEY KS

Sample ID#: 3076
ID: 117378
Report Date: 01-22-2016
Sample Date: 01-11-2016
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	11480
Magnesium(as Mg)	2952
Barium(as Ba)	0.204
Strontium(as Sr)	231.60
Sodium(as Na)	60472
Potassium(as K)	704.60
Lithium(as Li)	10.48
Iron(as Fe)	2.68
Field Iron(as Fe)	0.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.0120
Zinc(as Zn)	1.67
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	135800
Sulfate(as SO_4)	925.00
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	165.00
Bicarbonate(as HCO_3)	42.70
Carbonate(as CO_3)	0.00
Silica(as SiO_2)	0.00
Phosphate(as PO_4)	0.00
H_2S (as H_2S)	0.500
Fluoride(as F)	0.00
Nitrate(as NO_3)	0.00
Boron(as B)	24.99

PARAMETERS

Temperature(°F)	53.30
T.D.S.	203954
Sample pH	6.21
Conductivity:	349015
Resistivity:	2.87

SCALE AND CORROSION POTENTIAL

Temp. (°F)	Press. (atm)	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackawenite FeS		CO_2 (mpy)	pCO_2 (atm)
50.00	0.00	0.122	-0.00731	0.603	-60.30	0.836	-20.48	0.526	-0.109	0.243	-148.82	0.0109	-0.101	0.0364	-0.726	0.0729	0.00969
65.45	0.00	0.165	-0.00614	0.541	-72.01	0.725	-36.60	0.317	-0.260	0.210	-163.82	0.0165	-0.0802	0.0341	-0.741	0.186	0.00969
80.91	0.00	0.213	-0.00517	0.514	-74.62	0.643	-49.84	0.203	-0.472	0.194	-169.67	0.0238	-0.0644	0.0314	-0.759	0.0907	0.00969
96.36	0.00	0.265	-0.00438	0.514	-69.65	0.581	-60.29	0.138	-0.752	0.185	-170.44	0.0328	-0.0525	0.0285	-0.779	0.119	0.00969
111.82	0.00	0.318	-0.00372	0.539	-59.23	0.575	-57.97	0.0976	-1.11	0.179	-169.08	0.0433	-0.0434	0.0256	-0.800	0.125	0.00969
127.27	0.00	0.372	-0.00318	0.589	-45.63	0.603	-48.73	0.0703	-1.57	0.173	-168.41	0.0556	-0.0364	0.0231	-0.822	0.107	0.00969
142.73	0.00	0.425	-0.00273	0.667	-30.84	0.627	-41.66	0.0513	-2.19	0.167	-168.61	0.0692	-0.0309	0.0209	-0.846	0.0878	0.00969
158.18	0.00	0.471	-0.00238	0.782	-16.39	0.648	-36.26	0.0378	-2.99	0.160	-169.66	0.0834	-0.0266	0.0188	-0.871	0.0843	0.00969
173.64	0.00	0.505	-0.00213	0.945	-3.26	0.665	-32.14	0.0281	-4.01	0.153	-171.53	0.0967	-0.0232	0.0170	-0.898	0.0808	0.00969
189.09	0.00	0.523	-0.00198	1.17	8.05	0.679	-29.03	0.0211	-5.30	0.146	-174.22	0.108	-0.0206	0.0152	-0.927	0.0379	0.00969
204.55	0.00	0.520	-0.00194	1.49	17.40	0.690	-26.73	0.0160	-6.89	0.139	-177.75	0.115	-0.0186	0.0136	-0.958	0.0301	0.00969
220.00	0.171	0.487	-0.00211	1.93	25.42	0.693	-26.39	0.0122	-8.93	0.132	-186.16	0.115	-0.0176	0.0136	-0.996	0.0405	0.0113
		xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels	xSAT	Lbs per 1000 Barrels		

Saturation Levels (xSAT) are the ratio of ion activity to solubility, e.g. $\{Ca\}\{CO_3\}/K_{sp}$. pCO_2 (atm) is the partial pressure of CO_2 in the gas phase.
Lbs/1000 Barrels scale is the quantity of precipitation (or dissolution) required to instantaneously bring the water to equilibrium.