KOLAR Document ID: 1389204

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

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, LLC
Address 1: 600 TRAVIS STE 1400
Address 2:
City: HOUSTON State: TX Zip: 77002 + 3018
Contact Person: Daniel Busch
Phone: (281) 840-4234
Lease Name: MINNIE NEFF SWD
Well Number: 1

API No.: 15-187-21075-00-00
Permit No: D28743.0
Reporting Year: 2017
(January 1 to December 31)

(Q/Q/Q/Q) SE - SE - SE Sec. 20 Twp. 27 S. R. 39 ☐ E ☑ W
220 feet from ☐ N / ☑ S Line of Section
201 feet from ☑ E / ☐ W Line of Section
County: Stanton

I. Injection Fluid:

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

II. Well Data:

Maximum Authorized Injection Pressure: 0 psi Injection Zone: Lansing-Kansas City
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	15543	0	0		31
February	17262	0	0		28
March	18861	0	0		31
April	15058	0	0		30
May	7871	0	0		31
June	16583	0	0		30
July	15526	0	0		31
August	6000	0	0		31
September	8019	0	0		30
October	11214	0	0		31
November	11096	0	0		30
December	11786	0	0		31
TOTAL	154819		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_x

WATER CHEMISTRY

LINN OPERATING
JASON URWIN
STANTON KS

NEFF MINNIE 1 SWDW
STOCK TANK

Report Date: 03-08-2017
Sample #: 3076

Sampled: 03-08-2017
at 0000

Sample ID: 147894

CATIONS		ANIONS	
Calcium (as Ca)	4773	Chloride (as Cl)	158200
Magnesium (as Mg)	3147	Sulfate (as SO_4)	2150
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	128.90	Dissolved CO_2 (as CO_2)	31.00
Sodium (as Na)	78572	Bicarbonate (as HCO_3)	50.00
Potassium (as K)	572.50	Carbonate (as CO_3)	0.00
Lithium (as Li)	12.55	Oxalic acid (as C_2O_4)	0.00
Ammonia (as NH_3)	0.00	Silica (as SiO_2)	0.00
Aluminum (as Al)	1.18	Phosphate(as PO_4)	0.00
Iron (as Fe)	0.0510	H_2S (as H_2S)	0.00
Manganese (as Mn)	0.397	Fluoride (as F)	0.00
Zinc (as Zn)	0.0820	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	17.30

PARAMETERS

Calculated T.D.S.	233812
Molar Conductivity	421443
Resistivity	2.37
Sp.Gr.(g/mL)	1.17
Pressure(atm)	1.00
pCO_2(atm)	0.0141
pH_2S(atm)	0.00
Temperature (^oF)	60.00
pH	6.00

COMMENTS

STANTON KS

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

JACAM LABORATORIES

DownHole R_x

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
JASON URWIN
STANTON KS

NEFF MINNIE 1 SWDW
STOCK TANK

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SATURATION LEVEL	
Calcite ($CaCO_3$)	0.0494
Aragonite ($CaCO_3$)	0.0435
Witherite ($BaCO_3$)	< 0.001
Strontianite ($SrCO_3$)	0.00116
Calcium oxalate (CaC_2O_4)	0.00
Magnesite ($MgCO_3$)	0.0348
Anhydrite ($CaSO_4$)	0.706
Gypsum ($CaSO_4*2H_2O$)	0.911
Barite ($BaSO_4$)	1.03
Celestite ($SrSO_4$)	0.334
Fluorite (CaF_2)	0.00
Calcium phosphate	0.00
Hydroxyapatite	0.00
Silica (SiO_2)	0.00
Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	0.00
Siderite ($FeCO_3$)	< 0.001
Halite (NaCl)	0.287
Thenardite ($Na2SO_4$)	< 0.001
Iron sulfide (FeS)	0.00

MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	-0.0160
Aragonite ($CaCO_3$)	-0.0182
Witherite ($BaCO_3$)	-26.97
Strontianite ($SrCO_3$)	-1.04
Calcium oxalate (CaC_2O_4)	-0.00719
Magnesite ($MgCO_3$)	-0.0194
Anhydrite ($CaSO_4$)	-99.16
Gypsum ($CaSO_4*2H_2O$)	-26.62
Barite ($BaSO_4$)	0.00317
Celestite ($SrSO_4$)	-116.33
Fluorite (CaF_2)	-2.64
Calcium phosphate	>-0.001
Hydroxyapatite	-234.88
Silica (SiO_2)	-22.03
Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	-78.96
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	-0.406
Halite (NaCl)	-64343
Thenardite ($Na2SO_4$)	-87751
Iron sulfide (FeS)	-1.16

SIMPLE INDICES	
Langelier	-0.581
Ryznar	7.16
Puckorius	6.48
Larson-Skold Index	6777
Stiff Davis Index	-0.696
Oddo-Tomson	-1.69

BOUND IONS	TOTAL	FREE
Calcium	4773	4545
Barium	0.204	0.204
Carbonate	0.435	0.00143
Phosphate	0.00	0.00
Sulfate	2150	513.63

OPERATING CONDITIONS

Temperature (^oF)	60.00
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
NEFF MINNIE 1 SWDW
JASON URWIN
STOCK TANK
STANTON KS

Sample ID#: 3076
ID: 147894
Report Date: 03-08-2017
Sample Date: 03-08-2017
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	4773
Magnesium(as Mg)	3147
Barium(as Ba)	0.204
Strontium(as Sr)	128.90
Sodium(as Na)	78572
Potassium(as K)	572.50
Lithium(as Li)	12.55
Iron(as Fe)	0.0510
Field Iron(as Fe)	0.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	1.18
Manganese(as Mn)	0.397
Zinc(as Zn)	0.0820
Lead(as Pb)	0.00
Sample pH	6.00
Conductivity:	421443

ANIONS

Chloride(as Cl)	158200
Sulfate(as SO_4)	2150
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	31.00
Bicarbonate(as HCO_3)	50.00
Carbonate(as CO_3)	0.00
Silica(as SiO_2)	0.00
Phosphate(as PO_4)	0.00
H_2S (as H_2S)	0.00
Fluoride(as F)	0.00
Nitrate(as NO_3)	0.00
Boron(as B)	17.30

PARAMETERS

Temperature(°F)	60.00
T.D.S.	233812
Resistivity:	2.37

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	0.0396	-0.0176	0.769	-76.00	1.01	2.83	1.45	0.0375	0.373	-102.66	< 0.001	-0.440	0.00	-1.15	0.0958	0.0141
65.45	0.00	0.0551	-0.0152	0.681	-108.06	0.865	-41.34	0.861	-0.0196	0.319	-121.95	< 0.001	-0.389	0.00	-1.16	0.280	0.0141
80.91	0.00	0.0729	-0.0133	0.638	-119.92	0.756	-77.92	0.543	-0.102	0.289	-132.62	< 0.001	-0.346	0.00	-1.18	0.152	0.0141
96.36	0.00	0.0917	-0.0118	0.630	-114.88	0.674	-107.23	0.362	-0.213	0.271	-138.14	< 0.001	-0.312	0.00	-1.20	0.199	0.0141
111.82	0.00	0.110	-0.0106	0.650	-97.46	0.658	-106.88	0.253	-0.356	0.258	-141.21	< 0.001	-0.283	0.00	-1.22	0.212	0.0141
127.27	0.00	0.129	-0.00961	0.700	-72.40	0.680	-90.15	0.179	-0.552	0.246	-144.56	< 0.001	-0.258	0.00	-1.24	0.185	0.0141
142.73	0.00	0.146	-0.00882	0.783	-43.97	0.697	-77.71	0.129	-0.816	0.233	-148.42	< 0.001	-0.238	0.00	-1.27	0.156	0.0141
158.18	0.00	0.159	-0.00821	0.906	-15.51	0.711	-68.49	0.0933	-1.17	0.220	-152.76	0.00115	-0.221	0.00	-1.29	0.145	0.0141
173.64	0.00	0.167	-0.00777	1.08	10.73	0.721	-61.74	0.0684	-1.63	0.208	-157.57	0.00130	-0.207	0.00	-1.32	0.135	0.0141
189.09	0.00	0.167	-0.00749	1.33	33.51	0.727	-56.90	0.0507	-2.24	0.196	-162.89	0.00140	-0.195	0.00	-1.35	0.0591	0.0141
204.55	0.00	0.161	-0.00735	1.67	52.38	0.730	-53.59	0.0379	-3.02	0.184	-168.74	0.00145	-0.184	0.00	-1.39	0.0445	0.0141
220.00	0.171	0.145	-0.00762	2.13	68.74	0.725	-54.49	0.0284	-4.06	0.172	-178.57	0.00139	-0.179	0.00	-1.44	0.0594	0.0165
		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.