KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1294611

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) 840-4234
Lease Name: MCGANNON
Well Number: 3

API No.: 15-067-20609-00-01
Permit No: D26800.0
Reporting Year: 2015
(January 1 to December 31)

____ - NE - NW - NE Sec. 5 Twp. 29 S. R. 38 ☐ E ☑ W
(Q/Q/Q/Q)
4937 feet from ☐ N / ☑ S Line of Section
1385 feet from ☑ E / ☐ W Line of Section
County: Grant

I. Injection Fluid:

Type *(Pick one)*: ☐ Fresh Water ☑ Treated Brine ☐ Untreated Brine ☐ Water/Brine
Source: ☑ Produced Water ☐ Other *(Attach list)*
Quality: Total Dissolved Solids: 222488 mg/l Specific Gravity: 1.16 Additives: 15% HCL
(Attach water analysis, if available)

II. Well Data:

Maximum Authorized Injection Pressure: 300 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	3	-1	0		31
February	90	-12	0		28
March	268	-1	0		31
April	731	1	0		30
May	1025	2	0		31
June	624	-11	0		30
July	853	-4	0		31
August	459	-9	0		31
September	102	10	0		30
October	167	-9	0		31
November	313	-10	0		30
December	122	-10	0		31
TOTAL	4757		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

LINN OPERATING
MICHAEL BELLOMY

MCGANNON SWDW
FLOWLINE

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

Sampled: 01-11-2016
at 0000

Sample ID: 117371

CATIONS		ANIONS	
Calcium (as Ca)	10590	Chloride (as Cl)	150200
Magnesium (as Mg)	3076	Sulfate (as SO_4)	950.00
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	216.50	Dissolved CO_2 (as CO_2)	100.00
Sodium (as Na)	68471	Bicarbonate (as HCO_3)	18.30
Potassium (as K)	555.40	Carbonate (as CO_3)	0.00
Lithium (as Li)	7.71	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)	4.30	H_2S (as H_2S)	0.500
Manganese (as Mn)	0.396	Fluoride (as F)	0.00
Zinc (as Zn)	1.81	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	1.83

PARAMETERS

Calculated T.D.S.	222488
Molar Conductivity	398708
Resistivity	2.51
Sp.Gr.(g/mL)	1.16
Pressure(atm)	1.00
pCO_2(atm)	0.00504
pH_2S(atm)	< 0.001
Temperature (^oF)	49.20
pH	6.03

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

JACAM LABORATORIES

DownHole R_X

DEPOSITION POTENTIAL INDICATORS

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MICHAEL BELLOMY

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FLOWLINE

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SATURATION LEVEL	
Calcite ($CaCO_3$)	0.0317
Aragonite ($CaCO_3$)	0.0282
Witherite ($BaCO_3$)	< 0.001
Strontianite ($SrCO_3$)	< 0.001
Calcium oxalate (CaC_2O_4)	0.00
Magnesite ($MgCO_3$)	0.00887
Anhydrite ($CaSO_4$)	0.594
Gypsum ($CaSO_4*2H_2O$)	0.799
Barite ($BaSO_4$)	0.504
Celestite ($SrSO_4$)	0.214
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 ($FeCO_3$)	0.00432
Halite (NaCl)	0.246
Thenardite ($Na2SO_4$)	< 0.001
Iron sulfide (FeS)	0.00489

MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	-0.00792
Aragonite ($CaCO_3$)	-0.00894
Witherite ($BaCO_3$)	-25.47
Strontianite ($SrCO_3$)	-0.592
Calcium oxalate (CaC_2O_4)	-0.00311
Magnesite ($MgCO_3$)	-0.0244
Anhydrite ($CaSO_4$)	-61.97
Gypsum ($CaSO_4*2H_2O$)	-25.91
Barite ($BaSO_4$)	-0.119
Celestite ($SrSO_4$)	-162.21
Fluorite (CaF_2)	-1.70
Calcium phosphate	>-0.001
Hydroxyapatite	-222.78
Silica (SiO_2)	-19.24
Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	-73.78
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	-0.0677
Halite (NaCl)	-68598
Thenardite ($Na2SO_4$)	-88053
Iron sulfide (FeS)	-0.943

SIMPLE INDICES	
Langelier	-0.743
Ryznar	7.52
Puckorius	7.48
Larson-Skold Index	16688
Stiff Davis Index	-0.881
Oddo-Tomson	-1.85

BOUND IONS	TOTAL	FREE
Calcium	10590	10409
Barium	0.204	0.204
Carbonate	0.0864	< 0.001
Phosphate	0.00	0.00
Sulfate	950.00	186.10

OPERATING CONDITIONS

Temperature (^oF)	49.20
Time(secs)	0.00

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DownHole SAT™ Water Analysis Report

JACAM LABORATORIES

SYSTEM IDENTIFICATION

LINN OPERATING
MCGANNON SWDW
MICHAEL BELLOMY
FLOWLINE

Sample ID#: 3076
ID: 117371
Report Date: 01-22-2016
Sample Date: 01-11-2016
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WATER CHEMISTRY

CATIONS

Calcium(as Ca)	10590
Magnesium(as Mg)	3076
Barium(as Ba)	0.204
Strontium(as Sr)	216.50
Sodium(as Na)	68471
Potassium(as K)	555.40
Lithium(as Li)	7.71
Iron(as Fe)	4.30
Field Iron(as Fe)	0.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	0.396
Zinc(as Zn)	1.81
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	150200
Sulfate(as SO_4)	950.00
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	100.00
Bicarbonate(as HCO_3)	18.30
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)	1.83

PARAMETERS

Temperature(°F)	49.20
T.D.S.	222488
Sample pH	6.03
Conductivity:	398708
Resistivity:	2.51

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)
		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		
50.00	0.00	0.0322	-0.00787	0.590	-62.86	0.793	-26.86	0.490	-0.125	0.212	-163.36	0.00442	-0.0668	0.0263	-0.901	0.0636	0.00504
65.45	0.00	0.0436	-0.00686	0.527	-74.86	0.685	-43.60	0.294	-0.290	0.183	-178.83	0.00670	-0.0527	0.0250	-0.919	0.183	0.00504
80.91	0.00	0.0565	-0.00606	0.499	-77.67	0.604	-57.36	0.187	-0.521	0.168	-184.88	0.00969	-0.0424	0.0235	-0.939	0.0757	0.00504
96.36	0.00	0.0705	-0.00541	0.497	-72.81	0.544	-68.21	0.126	-0.828	0.159	-185.71	0.0134	-0.0346	0.0217	-0.962	0.0991	0.00504
111.82	0.00	0.0848	-0.00488	0.518	-62.44	0.536	-65.79	0.0893	-1.22	0.153	-184.34	0.0177	-0.0287	0.0199	-0.987	0.105	0.00504
127.27	0.00	0.0995	-0.00445	0.564	-48.84	0.560	-56.18	0.0641	-1.74	0.147	-183.67	0.0228	-0.0242	0.0183	-1.01	0.0919	0.00504
142.73	0.00	0.114	-0.00411	0.637	-34.02	0.580	-48.83	0.0465	-2.42	0.141	-183.93	0.0285	-0.0207	0.0168	-1.04	0.0771	0.00504
158.18	0.00	0.127	-0.00383	0.743	-19.52	0.597	-43.21	0.0341	-3.31	0.135	-185.06	0.0344	-0.0180	0.0154	-1.07	0.0720	0.00504
173.64	0.00	0.137	-0.00363	0.895	-6.32	0.610	-38.92	0.0253	-4.44	0.129	-187.05	0.0402	-0.0158	0.0141	-1.11	0.0670	0.00504
189.09	0.00	0.142	-0.00348	1.11	5.04	0.621	-35.69	0.0189	-5.87	0.123	-189.90	0.0450	-0.0141	0.0129	-1.14	0.0297	0.00504
204.55	0.00	0.142	-0.00339	1.41	14.44	0.629	-33.33	0.0143	-7.65	0.116	-193.64	0.0483	-0.0128	0.0117	-1.18	0.0225	0.00504
220.00	0.171	0.133	-0.00349	1.81	22.41	0.630	-33.17	0.0108	-9.90	0.110	-202.59	0.0487	-0.0121	0.0119	-1.23	0.0301	0.00590

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.