KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1292349

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: ADAMS
Well Number: 1

API No.: 15-093-20776-00-00
Permit No: D21561.0
Reporting Year: 2015
(January 1 to December 31)

NW - NW - NW - NW Sec. 19 Twp. 24 S. R. 37 ☐ E ☑ W
(Q/Q/Q/Q)
5176 feet from ☐ N / ☑ S Line of Section
5023 feet from ☑ E / ☐ W Line of Section
County: Kearny

I. Injection Fluid:

Type *(Pick one)*: ☐ Fresh Water ☐ Treated Brine ☑ Untreated Brine ☐ Water/Brine
Source: ☑ Produced Water ☐ Other *(Attach list)*
Quality: Total Dissolved Solids: 203194 mg/l Specific Gravity: 1.14 Additives:
(Attach water analysis, if available)

II. Well Data:

Maximum Authorized Injection Pressure: 0 psi Injection Zone: LANSING-KANSAS CITY
Maximum Authorized Injection Rate: 2400 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	8979	-18	0		31
February	7994	-19	0		28
March	9651	-26	0		31
April	10976	-21	0		30
May	9338	-22	0		30
June	8102	-22	0		30
July	7840	-22	0		31
August	6039	-22	0		31
September	5911	-18	0		30
October	7965	-16	0		31
November	6524	-21	0		30
December	6205	-24	0		31
TOTAL	95524		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

LINN OPERATING
DREW LOTT
KEARNY KS

ADAMS SWD
WATER DUMP VALVE

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

Sampled: 01-14-2016
at 0000

Sample ID: 117222

CATIONS		ANIONS	
Calcium (as Ca)	9356	Chloride (as Cl)	135600
Magnesium (as Mg)	3918	Sulfate (as SO_4)	1275
Barium (as Ba)	0.775	Bromine (as Br)	0.00
Strontium (as Sr)	184.20	Dissolved CO_2 (as CO_2)	70.00
Sodium (as Na)	61082	Bicarbonate (as HCO_3)	36.60
Potassium (as K)	581.50	Carbonate (as CO_3)	0.00
Lithium (as Li)	9.28	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)	5.21	H_2S (as H_2S)	0.500
Manganese (as Mn)	1.03	Fluoride (as F)	0.00
Zinc (as Zn)	2.28	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	7.91

PARAMETERS

Calculated T.D.S.	203194
Molar Conductivity	349520
Resistivity	2.86
Sp.Gr.(g/mL)	1.14
Pressure(atm)	1.00
pCO_2(atm)	0.00222
pH_2S(atm)	< 0.001
Temperature (^oF)	48.00
pH	7.00

COMMENTS

KEARNY KS

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

JACAM LABORATORIES

DownHole R_X

DEPOSITION POTENTIAL INDICATORS

LINN OPERATING
DREW LOTT
KEARNY KS

ADAMS SWD
WATER DUMP VALVE

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SATURATION LEVEL		MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	0.424	Calcite ($CaCO_3$)	-0.00610
Aragonite ($CaCO_3$)	0.377	Aragonite ($CaCO_3$)	-0.00740
Witherite ($BaCO_3$)	< 0.001	Witherite ($BaCO_3$)	-24.81
Strontianite ($SrCO_3$)	0.00976	Strontianite ($SrCO_3$)	-0.666
Calcium oxalate (CaC_2O_4)	0.00	Calcium oxalate (CaC_2O_4)	-0.00397
Magnesite ($MgCO_3$)	0.163	Magnesite ($MgCO_3$)	-0.0193
Anhydrite ($CaSO_4$)	0.701	Anhydrite ($CaSO_4$)	-55.81
Gypsum ($CaSO_4*2H_2O$)	0.973	Gypsum ($CaSO_4*2H_2O$)	-4.17
Barite ($BaSO_4$)	3.06	Barite ($BaSO_4$)	0.309
Celestite ($SrSO_4$)	0.282	Celestite ($SrSO_4$)	-136.36
Fluorite (CaF_2)	0.00	Fluorite (CaF_2)	-1.92
Calcium phosphate	0.00	Calcium phosphate	>-0.001
Hydroxyapatite	0.00	Hydroxyapatite	-233.25
Silica (SiO_2)	0.00	Silica (SiO_2)	-19.63
Brucite ($Mg(OH)_2$)	< 0.001	Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00	Magnesium silicate	-75.43
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 ($FeCO_3$)	0.0903	Siderite ($FeCO_3$)	-0.0515
Halite (NaCl)	0.188	Halite (NaCl)	-79979
Thenardite ($Na2SO_4$)	< 0.001	Thenardite ($Na2SO_4$)	-87288
Iron sulfide (FeS)	0.255	Iron sulfide (FeS)	-0.148

SIMPLE INDICES		BOUND IONS	TOTAL	FREE
Langelier	0.403	Calcium	9356	9142
Ryznar	6.19	Barium	0.775	0.775
Puckorius	6.71	Carbonate	1.04	0.00771
Larson-Skold Index	7985	Phosphate	0.00	0.00
Stiff Davis Index	0.199	Sulfate	1275	269.22
Oddo-Tomson	-0.729			

OPERATING CONDITIONS

Temperature (^oF)	48.00
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
ADAMS SWD
DREW LOTT
WATER DUMP VALVE
KEARNY KS

Sample ID#: 3076
ID: 117222
Report Date: 01-22-2016
Sample Date: 01-14-2016
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	9356
Magnesium(as Mg)	3918
Barium(as Ba)	0.775
Strontium(as Sr)	184.20
Sodium(as Na)	61082
Potassium(as K)	581.50
Lithium(as Li)	9.28
Iron(as Fe)	5.21
Field Iron(as Fe)	5.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	0.00
Manganese(as Mn)	1.03
Zinc(as Zn)	2.28
Lead(as Pb)	0.00
Sample pH	7.00
Conductivity:	349520

ANIONS

Chloride(as Cl)	135600
Sulfate(as SO_4)	1275
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	70.00
Bicarbonate(as HCO_3)	36.60
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)	7.91

PARAMETERS

Temperature(°F)	48.00
T.D.S.	203194
Resistivity:	2.86

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	0.441	-0.00581	0.687	-58.90	0.952	-7.43	2.84	0.297	0.275	-139.51	0.0956	-0.0495	1.38	0.0641	0.0268	0.00222
65.45	0.00	0.588	-0.00378	0.609	-75.95	0.816	-30.36	1.69	0.187	0.235	-156.63	0.143	-0.0371	1.13	0.0239	0.0599	0.00222
80.91	0.00	0.738	-0.00215	0.571	-81.43	0.714	-49.32	1.07	0.0298	0.214	-164.45	0.199	-0.0279	0.929	-0.0134	0.0215	0.00222
96.36	0.00	0.871	>-0.001	0.565	-77.23	0.638	-64.45	0.716	-0.181	0.201	-166.99	0.260	-0.0211	0.763	-0.0471	0.0281	0.00222
111.82	0.00	0.966	>-0.001	0.584	-66.04	0.624	-63.48	0.502	-0.453	0.193	-167.19	0.318	-0.0163	0.630	-0.0775	0.0295	0.00222
127.27	0.00	1.02	< 0.001	0.631	-50.69	0.646	-53.71	0.357	-0.820	0.184	-167.91	0.366	-0.0128	0.525	-0.105	0.0245	0.00222
142.73	0.00	1.02	< 0.001	0.707	-33.64	0.664	-46.37	0.257	-1.31	0.175	-169.33	0.397	-0.0105	0.441	-0.130	0.0198	0.00222
158.18	0.00	0.966	>-0.001	0.820	-16.81	0.679	-40.87	0.187	-1.96	0.166	-171.44	0.408	-0.00906	0.371	-0.153	0.0209	0.00222
173.64	0.00	0.877	>-0.001	0.981	-1.44	0.690	-36.78	0.138	-2.80	0.157	-174.22	0.397	-0.00823	0.313	-0.176	0.0216	0.00222
189.09	0.00	0.766	-0.00121	1.21	11.82	0.698	-33.78	0.103	-3.87	0.149	-177.70	0.369	-0.00782	0.264	-0.200	0.0109	0.00222
204.55	0.00	0.649	-0.00177	1.52	22.78	0.703	-31.64	0.0772	-5.23	0.141	-181.89	0.329	-0.00768	0.222	-0.223	0.00912	0.00222
220.00	0.171	0.522	-0.00245	1.95	32.23	0.701	-31.76	0.0582	-6.98	0.132	-190.70	0.277	-0.00806	0.208	-0.242	0.0124	0.00260
		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.