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: H E WINSTEAD
Well Number: 2

API No.: 15-081-10223-00-01
Permit No: D24817.0
Reporting Year: 2017
(January 1 to December 31)

NW (Q/Q/Q/Q) - SE - NE - SW Sec. 29 Twp. 28 S. R. 34 ☐ E ☑ W
3303 feet from ☐ N / ☑ S Line of Section
3286 feet from ☑ E / ☐ W Line of Section
County: Haskell

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: 1000 psi Injection Zone: Topeka, Deer Creek Upper
Maximum Authorized Injection Rate: 2000 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	3461	0	0		11
February	7331	0	0		22
March	8086	0	0		21
April	7961	0	0		21
May	7958	0	0		21
June	9600	0	0		28
July	6351	0	0		21
August	5807	0	0		18
September	11840	0	0		28
October	13161	0	0		30
November	11935	0	0		29
December	10595	0	0		29
TOTAL	104086		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_x

WATER CHEMISTRY

LINN OPERATING
JASON URWIN
HASKELL KS

WINSTEAD SWDW
STOCK TANK

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

Sampled: 03-08-2017
at 0000

Sample ID: 147879

CATIONS		ANIONS	
Calcium (as Ca)	11260	Chloride (as Cl)	128800
Magnesium (as Mg)	3932	Sulfate (as SO_4)	1475
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	271.80	Dissolved CO_2 (as CO_2)	160.00
Sodium (as Na)	55550	Bicarbonate (as HCO_3)	92.00
Potassium (as K)	796.90	Carbonate (as CO_3)	0.00
Lithium (as Li)	16.97	Oxalic acid (as C_2O_4)	0.00
Ammonia (as NH_3)	0.00	Silica (as SiO_2)	0.00
Aluminum (as Al)	1.08	Phosphate(as PO_4)	0.00
Iron (as Fe)	0.0510	H_2S (as H_2S)	0.00
Manganese (as Mn)	0.0210	Fluoride (as F)	0.00
Zinc (as Zn)	0.0820	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	35.05

PARAMETERS

Calculated T.D.S.	194900
Molar Conductivity	325499
Resistivity	3.07
Sp.Gr.(g/mL)	1.14
Pressure(atm)	1.00
pCO_2(atm)	0.00561
pH_2S(atm)	0.00
Temperature (^oF)	60.00
pH	7.00

COMMENTS

HASKELL 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
HASKELL KS

WINSTEAD SWDW
STOCK TANK

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SATURATION LEVEL	
Calcite ($CaCO_3$)	1.54
Aragonite ($CaCO_3$)	1.36
Witherite ($BaCO_3$)	< 0.001
Strontianite ($SrCO_3$)	0.0384
Calcium oxalate (CaC_2O_4)	0.00
Magnesite ($MgCO_3$)	0.555
Anhydrite ($CaSO_4$)	0.817
Gypsum ($CaSO_4*2H_2O$)	1.13
Barite ($BaSO_4$)	0.598
Celestite ($SrSO_4$)	0.409
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 ($Fe(OH)_3$)	0.0310
Strengite ($FePO_4*2H_2O$)	0.00
Siderite ($FeCO_3$)	0.00306
Halite (NaCl)	0.152
Thenardite ($Na2SO_4$)	< 0.001
Iron sulfide (FeS)	0.00

MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	0.00451
Aragonite ($CaCO_3$)	0.00340
Witherite ($BaCO_3$)	-26.65
Strontianite ($SrCO_3$)	-0.471
Calcium oxalate (CaC_2O_4)	-0.00354
Magnesite ($MgCO_3$)	-0.00864
Anhydrite ($CaSO_4$)	-30.38
Gypsum ($CaSO_4*2H_2O$)	17.68
Barite ($BaSO_4$)	-0.0811
Celestite ($SrSO_4$)	-107.88
Fluorite (CaF_2)	-1.87
Calcium phosphate	>-0.001
Hydroxyapatite	-255.16
Silica (SiO_2)	-24.01
Brucite ($Mg(OH)_2$)	0.00149
Magnesium silicate	-81.96
Iron hydroxide ($Fe(OH)_3$)	< 0.001
Strengite ($FePO_4*2H_2O$)	>-0.001
Siderite ($FeCO_3$)	-0.395
Halite (NaCl)	-89221
Thenardite ($Na2SO_4$)	-87162
Iron sulfide (FeS)	-0.364

SIMPLE INDICES	
Langelier	0.981
Ryznar	5.04
Puckorius	4.95
Larson-Skold Index	3018
Stiff Davis Index	0.751
Oddo-Tomson	-0.162

BOUND IONS	TOTAL	FREE
Calcium	11260	10983
Barium	0.204	0.204
Carbonate	3.35	0.0220
Phosphate	0.00	0.00
Sulfate	1475	277.82

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
WINSTEAD SWDW
JASON URWIN
STOCK TANK
HASKELL KS

Sample ID#: 3076
ID: 147879
Report Date: 03-08-2017
Sample Date: 03-08-2017
at 0000

WATER CHEMISTRY

CATIONS

Calcium(as Ca)	11260
Magnesium(as Mg)	3932
Barium(as Ba)	0.204
Strontium(as Sr)	271.80
Sodium(as Na)	55550
Potassium(as K)	796.90
Lithium(as Li)	16.97
Iron(as Fe)	0.0510
Field Iron(as Fe)	0.00
Ammonia(as NH_3)	0.00
Aluminum(as Al)	1.08
Manganese(as Mn)	0.0210
Zinc(as Zn)	0.0820
Lead(as Pb)	0.00

ANIONS

Chloride(as Cl)	128800
Sulfate(as SO_4)	1475
Bromine(as Br)	0.00
Dissolved CO_2(as CO_2)	160.00
Bicarbonate(as HCO_3)	92.00
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)	35.05

PARAMETERS

Temperature(°F)	60.00
T.D.S.	194900
Sample pH	7.00
Conductivity:	325499
Resistivity:	3.07

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	1.28	0.00248	0.887	-18.22	1.25	32.42	0.842	-0.0227	0.456	-94.88	0.00235	-0.430	0.00	-0.361	0.0412	0.00561
65.45	0.00	1.70	0.00553	0.789	-35.13	1.07	10.30	0.502	-0.120	0.391	-112.93	0.00350	-0.378	0.00	-0.366	0.0538	0.00561
80.91	0.00	2.14	0.00808	0.744	-41.80	0.944	-8.12	0.319	-0.257	0.358	-121.61	0.00491	-0.335	0.00	-0.371	0.0123	0.00561
96.36	0.00	2.55	0.00997	0.738	-39.87	0.847	-23.00	0.215	-0.441	0.338	-124.98	0.00648	-0.300	0.00	-0.377	0.0305	0.00561
111.82	0.00	2.88	0.0110	0.767	-31.74	0.832	-24.01	0.151	-0.676	0.325	-125.97	0.00804	-0.271	0.00	-0.384	0.0320	0.00561
127.27	0.00	3.10	0.0114	0.831	-19.83	0.865	-17.29	0.108	-0.992	0.311	-127.37	0.00947	-0.247	0.00	-0.391	0.0268	0.00561
142.73	0.00	3.18	0.0111	0.936	-6.32	0.893	-12.45	0.0780	-1.41	0.297	-129.39	0.0106	-0.227	0.00	-0.399	0.0217	0.00561
158.18	0.00	3.11	0.0102	1.09	7.14	0.916	-8.97	0.0571	-1.97	0.283	-132.01	0.0111	-0.211	0.00	-0.407	0.0226	0.00561
173.64	0.00	2.90	0.00879	1.31	19.48	0.935	-6.50	0.0422	-2.69	0.270	-135.20	0.0112	-0.198	0.00	-0.416	0.0234	0.00561
189.09	0.00	2.60	0.00713	1.62	30.13	0.949	-4.80	0.0315	-3.61	0.256	-138.99	0.0106	-0.187	0.00	-0.426	0.0118	0.00561
204.55	0.00	2.25	0.00544	2.05	38.94	0.959	-3.65	0.0238	-4.78	0.243	-143.40	0.00969	-0.178	0.00	-0.437	0.00412	0.00561
220.00	0.171	1.85	0.00374	2.64	47.15	0.960	-3.58	0.0180	-6.29	0.229	-151.86	0.00830	-0.174	0.00	-0.453	0.0111	0.00656
		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.