KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1294816

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: NOLAN JOHN
Well Number: 1-SWD

API No.: 15-055-20447-00-00
Permit No: D19974.0
Reporting Year: 2015
(January 1 to December 31)

(Q/Q/Q/Q) SW - SW - NE Sec. 21 Twp. 26 S. R. 34 ☐ E ☑ W
2798 feet from ☐ N / ☑ S Line of Section
2417 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: 204239 mg/l Specific Gravity: 1.14 Additives:
(Attach water analysis, if available)

II. Well Data:

Maximum Authorized Injection Pressure: 350 psi Injection Zone: GLORIETTA
Maximum Authorized Injection Rate: 1500 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	7180	0	0		31
February	7140	0	0		28
March	8350	0	0		31
April	8680	0	0		30
May	7190	0	0		31
June	2220	0	0		30
July	7580	300	0		31
August	8310	0	0		31
September	8470	0	0		30
October	7540	0	0		31
November	7870	0	0		30
December	9700	0	0		31
TOTAL	90230		0		

Submitted Electronically

JACAM LABORATORIES

DownHole R_X

WATER CHEMISTRY

LINN OPERATING
MICHAEL BELLOMY
FINNEY KS

NOLAN SWD
FLOWLINE

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

Sampled: 01-11-2016
at 0000

Sample ID: 117377

CATIONS		ANIONS	
Calcium (as Ca)	11750	Chloride (as Cl)	136000
Magnesium (as Mg)	3012	Sulfate (as SO_4)	925.00
Barium (as Ba)	0.204	Bromine (as Br)	0.00
Strontium (as Sr)	234.40	Dissolved CO_2 (as CO_2)	195.00
Sodium (as Na)	60262	Bicarbonate (as HCO_3)	30.50
Potassium (as K)	706.80	Carbonate (as CO_3)	0.00
Lithium (as Li)	10.60	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)	0.0510	H_2S (as H_2S)	1.00
Manganese (as Mn)	0.0120	Fluoride (as F)	0.00
Zinc (as Zn)	1.30	Nitrate (as NO_3)	0.00
Lead (as Pb)	0.00	Boron (as B)	25.97

PARAMETERS

Calculated T.D.S.	204239
Molar Conductivity	350818
Resistivity	2.85
Sp.Gr.(g/mL)	1.14
Pressure(atm)	1.00
pCO_2(atm)	0.00777
pH_2S(atm)	< 0.001
Temperature (^oF)	53.00
pH	6.11

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

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FLOWLINE

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SATURATION LEVEL		MOMENTARY EXCESS (Lbs/1000 Barrels)	
Calcite ($CaCO_3$)	0.0748	Calcite ($CaCO_3$)	-0.00727
Aragonite ($CaCO_3$)	0.0664	Aragonite ($CaCO_3$)	-0.00827
Witherite ($BaCO_3$)	< 0.001	Witherite ($BaCO_3$)	-25.76
Strontianite ($SrCO_3$)	0.00157	Strontianite ($SrCO_3$)	-0.548
Calcium oxalate (CaC_2O_4)	0.00	Calcium oxalate (CaC_2O_4)	-0.00311
Magnesite ($MgCO_3$)	0.0187	Magnesite ($MgCO_3$)	-0.0260
Anhydrite ($CaSO_4$)	0.594	Anhydrite ($CaSO_4$)	-60.50
Gypsum ($CaSO_4*2H_2O$)	0.820	Gypsum ($CaSO_4*2H_2O$)	-22.12
Barite ($BaSO_4$)	0.464	Barite ($BaSO_4$)	-0.139
Celestite ($SrSO_4$)	0.232	Celestite ($SrSO_4$)	-153.34
Fluorite (CaF_2)	0.00	Fluorite (CaF_2)	-1.72
Calcium phosphate	0.00	Calcium phosphate	>-0.001
Hydroxyapatite	0.00	Hydroxyapatite	-238.24
Silica (SiO_2)	0.00	Silica (SiO_2)	-21.12
Brucite ($Mg(OH)_2$)	< 0.001	Brucite ($Mg(OH)_2$)	< 0.001
Magnesium silicate	0.00	Magnesium silicate	-77.28
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 ($FeCO_3$)	< 0.001	Siderite ($FeCO_3$)	-0.427
Halite (NaCl)	0.185	Halite (NaCl)	-80641
Thenardite ($Na2SO_4$)	< 0.001	Thenardite ($Na2SO_4$)	-87236
Iron sulfide (FeS)	< 0.001	Iron sulfide (FeS)	-0.991

SIMPLE INDICES		BOUND IONS	TOTAL	FREE
Langelier	-0.399	Calcium	11750	11561
Ryznar	6.91	Barium	0.204	0.204
Puckorius	6.61	Carbonate	0.158	0.00101
Larson-Skold Index	9014	Phosphate	0.00	0.00
Stiff Davis Index	-0.601	Sulfate	925.00	181.25
Oddo-Tomson	-1.53			

OPERATING CONDITIONS

Temperature (^oF)	53.00
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
NOLAN SWD
MICHAEL BELLOMY
FLOWLINE
FINNEY KS

Sample ID#: 3076
ID: 117377
Report Date: 01-22-2016
Sample Date: 01-11-2016
at 0000

WATER CHEMISTRY

CATIONS		ANIONS	
Calcium(as Ca)	11750	Chloride(as Cl)	136000
Magnesium(as Mg)	3012	Sulfate(as SO_4)	925.00
Barium(as Ba)	0.204	Bromine(as Br)	0.00
Strontium(as Sr)	234.40	Dissolved CO_2(as CO_2)	195.00
Sodium(as Na)	60262	Bicarbonate(as HCO_3)	30.50
Potassium(as K)	706.80	Carbonate(as CO_3)	0.00
Lithium(as Li)	10.60	Silica(as SiO_2)	0.00
Iron(as Fe)	0.0510	Phosphate(as PO_4)	0.00
Field Iron(as Fe)	0.00	H_2S (as H_2S)	1.00
Ammonia(as NH_3)	0.00	Fluoride(as F)	0.00
Aluminum(as Al)	0.00	Nitrate(as NO_3)	0.00
Manganese(as Mn)	0.0120	Boron(as B)	25.97
Zinc(as Zn)	1.30		
Lead(as Pb)	0.00	**PARAMETERS**	
		Temperature(^oF)	53.00
Sample pH	6.11	T.D.S.	204239
Conductivity:	350818	Resistivity:	2.85

SCALE AND CORROSION POTENTIAL

Temp.	Press.	Calcite $CaCO_3$		Anhydrite $CaSO_4$		Gypsum $CaSO_4*2H_2O$		Barite $BaSO_4$		Celestite $SrSO_4$		Siderite $FeCO_3$		Mackawenite FeS		CO_2	pCO_2
(^oF)	(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	(mpy)	(atm)
50.00	0.00	0.0704	-0.00749	0.610	-57.55	0.844	-18.84	0.515	-0.114	0.241	-149.48	< 0.001	-0.438	< 0.001	-0.906	0.0714	0.00777
65.45	0.00	0.0948	-0.00644	0.547	-69.02	0.732	-34.61	0.310	-0.268	0.208	-164.45	< 0.001	-0.386	< 0.001	-0.921	0.195	0.00777
80.91	0.00	0.123	-0.00558	0.519	-71.65	0.649	-47.57	0.199	-0.486	0.192	-170.26	< 0.001	-0.344	< 0.001	-0.938	0.0903	0.00777
96.36	0.00	0.153	-0.00488	0.519	-66.89	0.586	-57.80	0.135	-0.772	0.183	-170.99	< 0.001	-0.310	< 0.001	-0.957	0.118	0.00777
111.82	0.00	0.184	-0.00431	0.544	-56.84	0.580	-55.61	0.0954	-1.13	0.177	-169.60	< 0.001	-0.281	< 0.001	-0.979	0.125	0.00777
127.27	0.00	0.217	-0.00384	0.594	-43.69	0.608	-46.70	0.0687	-1.61	0.171	-168.89	< 0.001	-0.257	< 0.001	-1.00	0.108	0.00777
142.73	0.00	0.250	-0.00345	0.673	-29.39	0.632	-39.88	0.0501	-2.24	0.165	-169.07	< 0.001	-0.237	< 0.001	-1.02	0.0898	0.00777
158.18	0.00	0.280	-0.00313	0.789	-15.40	0.653	-34.68	0.0369	-3.06	0.158	-170.09	< 0.001	-0.220	< 0.001	-1.05	0.0848	0.00777
173.64	0.00	0.305	-0.00289	0.954	-2.69	0.670	-30.72	0.0274	-4.10	0.151	-171.94	0.00108	-0.205	< 0.001	-1.08	0.0798	0.00777
189.09	0.00	0.321	-0.00273	1.18	8.26	0.684	-27.73	0.0206	-5.41	0.144	-174.61	0.00122	-0.193	< 0.001	-1.11	0.0363	0.00777
204.55	0.00	0.327	-0.00264	1.51	17.31	0.695	-25.52	0.0156	-7.04	0.138	-178.13	0.00133	-0.183	< 0.001	-1.14	0.0282	0.00777
220.00	0.171	0.313	-0.00274	1.95	25.09	0.698	-25.19	0.0119	-9.11	0.130	-186.55	0.00137	-0.178	< 0.001	-1.17	0.0377	0.00910

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.